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CHANGING MORPHOLOGY OF RESIDENTIAL AREAS  
IN TRANSITION

by



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A THESIS  
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## ABSTRACT

The study of the changing physical morphology of residential areas in transition and the analysis of the processes of land use and physical change which restructure transition neighbourhoods have been neglected in urban research. To meet this deficiency, this thesis examined (1) the interaction through time and space of the dwelling conversion and redevelopment processes which form a transition pattern; (2) the sequence of land use and physical change which occurs in the evolutionary development of transition areas; and (3) the relationship between housing characteristics and the location, amount and type of land use and physical change. The analysis of these problems relied on the comprehensive property records maintained in the Assessor's Department of the City of Edmonton.

Conversion activity was found to expand concentrically in a continuous outward progression from major development nodes, especially the central business district. Apartment redevelopment expanded sectorally from this centre, pushing into the high-rent district and expanding along major access routes. It was also spatially clustered around outlying business and institutional centres. Housing qualities demonstrated a significant control on transition pattern formation.





The study also revealed that neighbourhoods evolve through a predictable sequence of land use and physical changes, including successive stages of single-family growth, dwelling conversion and apartment redevelopment. Moreover, the amount and types of change and the order of site selection in the conversion and redevelopment processes were found to be closely associated with a transition area's housing characteristics.

The findings of the study are summarized by developing a spatio-temporal model of the changing physical morphology of residential areas in transition.

Discussions and advice from staff and students of the Department of Geography helped to clarify many of the problems of analysis. Professors Denis Johnson, Ken Fairbairn and Brent Barr (now of the University of Calgary) and fellow students Norm Cook, George Ziebar and Kevin McCracken made many valuable suggestions. Discussions with Dr. Richard Preston, while he was Visiting Professor in the Department, were invaluable in developing the research strategy. Dr. Karel Krotki of the Department of Sociology gave readily of his vast experience in survey methods to help devise the sampling procedure used in the study. Skillful technical assistance was given by Jack Chesterman, Geoff Lester and Mrs. Stephanie

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The findings of the study are summarized by developing a spatio-temporal model of the changing physical morphology of residential areas in transition.

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## TABLE OF CONTENTS

	Page
ABSTRACT	iii
ACKNOWLEDGEMENTS	v
TABLE OF CONTENTS	vii
LIST OF TABLES	xi
LIST OF FIGURES	xv
INTRODUCTION	xviii
CHAPTER	
I.    METHODOLOGY	1
A.    Assessment Data	1
B.    The Study Period	3
C.    The Study Area	4
D.    The Sample	7
E.    Data Problems: Reconstructing the Past	9
F.    Data Aggregation and Units of Observation	12
G.    Land Use Classification	14
H.    Measurement of Transition Processes	16
I.    Field Research	17
II.   DIMENSIONS OF LAND USE AND PHYSICAL CHANGE IN THE 1951 BUILT-UP AREA	18
A.    Concentration of Change in the 1951 Built-Up Area	18
B.    Physical Expansion and Evolving Morphology	20
C.    Changing Residential Land Use Structure	27
D.    Composition and Magnitude of Physical Change	31
E.    Summary	36
III.  THE SPATIAL DEVELOPMENT OF RESIDENTIAL AREAS IN TRANSITION	39
A.    A Spatial Model of Transition Area Development	40
B.    Spatial Processes and Changing Patterns of Transition Area Development	46
1.    Measurement of Spatial Processes of Change	46





CHAPTER	Page
2. Changing Patterns of the Dwelling Conversion Process	47
a. All Types of Converted Dwellings	47
b. Multiple-Family Conversions	60
c. Two-Family Upper-Storey Conversions	63
d. Two-Family Basement Conversions	63
e. Other Types of Converted Dwellings	68
3. Changing Patterns of the Reconversion Process	69
4. Changing Patterns of the Redevelopment Process	71
a. All Types of Redevelopment	71
b. High Rise Apartment Redevelopment	77
c. Walk-Up Apartment Redevelopment	78
d. Other Types of Redevelopment	83
C. Summary	83
IV. THE SEQUENTIAL DEVELOPMENT OF RESIDENTIAL AREAS IN TRANSITION	87
A. A Stage Model of Transition Area Development	88
B. Temporal Processes and the Formation of Transition Areas	91
1. Land Use Succession in Transition Areas	91
2. Measurement of Land Use Succession	92
3. Components of Land Use Succession Processes	99
a. Land Use Transferred In	100
b. Land Use Transferred Out	102
c. Stability and Change in Land Use Succession	104
4. The Sequence of Change in Transition Areas	106
a. Stage 1 - Single-Family Development	106
b. Stage 2 - Dwelling Conversion	110
c. Stage 3 - Apartment Redevelopment	111
C. Summary	112
V. THE DWELLING CONVERSION PROCESS IN TRANSITION AREAS	114
A. Residential Morphology and the Dwelling Conversion Process	115
B. Housing Correlates of the Dwelling Conversion Process	117





CHAPTER	Page
1. Measurement of Areal and Site Correlates	117
2. Areal Correlates of Conversion	124
3. Site Correlates of Conversion	128
a. House Types	128
b. House Size	131
c. House Age	131
d. House Quality	134
e. Ownership Status	137
4. Site Selection and Conversion Through Time	140
C. Summary	145
VI. THE APARTMENT REDEVELOPMENT PROCESS IN TRANSITION AREAS	147
A. Residential Morphology and the Redevelopment Process	148
B. Housing Correlates of the Apartment Redevelopment Process	151
1. The Apartment Redevelopment Study Areas	151
2. Measurement of Areal and Site Correlates	156
3. Areal Correlates of Apartment Redevelopment	162
4. Site Correlates of Apartment Redevelopment	168
a. Parcel Size	168
b. Residential Types	171
c. House Age	174
d. House Quality	177
e. Ownership Status	177
5. Site Selection and Walk-Up Apartment Redevelopment Along Major Arterials	181
6. Site Selection and Apartment Redevelopment Through Time	183
C. Summary	186
VII. A MODEL OF THE CHANGING PHYSICAL MORPHOLOGY OF TRANSITION AREAS	189
A. A Model of the Changing Physical Morphology of Transition Areas	190
1. Spatial Requirements, Measurement and Findings	191
2. Temporal Requirements, Measurement and Findings	194



CHAPTER	Page
3. The Model	198
B. Model Evaluation and Suggestions for Further Research	203
BIBLIOGRAPHY	208
APPENDICES	226
APPENDIX A	227
APPENDIX B	231





## LIST OF TABLES

Table	Page
1. Categories of Variables Collected from Assessment Records	4
2. Residential Land Use Classification	16
3. Land Use Structure of the City of Edmonton and the 1951 Built-Up Area in 1971	19
4. Selected Characteristics of the Morphology of the 1951 Built-Up Area	23
5. Housing Starts in the City of Edmonton to 1971	25
6. Changes in the Residential Land Use Structure of the 1951 Built-Up Area, 1921-1971	28
7. Changes in the Residential Land Use Structure of the 1951 Built-Up Area, 1921-1971	29
8. The Residential Conversion Process in the 1951 Built-Up Area, 1922-1971	33
9. The Residential Redevelopment Process in the 1951 Built-Up Area, 1952-1971	34
10. Summary of Residential Redevelopment in the 1951 Built-Up Area, 1952-1971	35
11. Land Use Succession Matrix, 1951 Built-Up Area, 1922-1931	94
12. Land Use Succession Matrix, 1951 Built-Up Area, 1932-1941	95
13. Land Use Succession Matrix, 1951 Built-Up Area, 1942-1951	96
14. Land Use Succession Matrix, 1951 Built-Up Area, 1952-1961	97





Table	Page
15. Land Use Succession Matrix, 1951 Built-Up Area, 1962-1971	98
16. Land Use Transferred In, 1951 Built-Up Area, 1942-1971	101
17. Land Use Transferred Out, 1951 Built-Up Area, 1942-1971	103
18. Stability and Change in Land Use in the 1951 Built-Up Area, 1922-1971	105
19. Land Use Succession and the Sequence of Change in the 1951 Built-Up Area, 1942-1971	107
20. Land Use Succession and the Transition Sequence in the 1951 Built-Up Area, 1942-1971	108
21. Housing Variables Used in the Correlation Analysis	122
22. Spatial Association Between Converted Dwellings and Selected Housing Characteristics for Enumeration Areas in the 1951 Built-Up Area, 1961	125
23. House Types and Site Characteristics of Converted Dwellings in the 1951 Built-Up Area, 1961	129
24. House Size and Site Characteristics of Converted Dwellings in the 1951 Built-Up Area, 1961	132
25. Housing Age and Site Characteristics of Converted Dwellings in the 1951 Built-Up Area, 1961	133
26. Age of Dwellings When Converted in the 1951 Built-Up Area	135
27. Quality of House Construction and Site Characteristics of Converted Dwellings in the 1951 Built-Up Area, 1961	136
28. Ownership Change and Conversion in the 1951 Built-Up Area	139



Table	Page
29. Occupancy Status and Conversion in the 1951 Built-Up Area	139
30. Site Selection and Multiple-Family Conversion Through Time in the 1951 Built-Up Area	141
31. Site Selection and Upper-Storey Conversion Through Time in the 1951 Built-Up Area	142
32. Site Selection and Basement Conversion Through Time in the 1951 Built-Up Area	143
33. Settlement of the Major Redevelopment Districts by the Period of Initial Occupancy of Each Land Parcel	152
34. Types of Redevelopment in the Major Redevelopment Districts	154
35. Status of Houses in the Major Redevelopment Districts	155
36. Housing Variables Used in the Correlation Analysis	160
37. Selected Characteristics of the Morphology of the Major Redevelopment Districts, Non-Redevelopment Areas in the 1951 Built-Up Area, 1961	163
38. Surveyed Lot Size and Minimum Zoning Requirements for Apartment Sites in the Major Redevelopment Districts	165
39. Spatial Association Between Apartment Redevelopment and Selected Housing Characteristics for Enumeration Areas in the Zoned Apartment Districts	166
40. Parcel Size and Site Characteristics of Existing and Replaced Properties in the Major Redevelopment Districts	170
41. Residential Land Use Types and Site Characteristics of Existing and Replaced Properties in the Major Redevelopment Districts	172





Table	Page
42. Residential Land Use Types and Status of Houses in the Major Redevelopment Districts	173
43. House Age and Site Characteristics of Existing and Replaced Properties in the Major Redevelopment Districts	175
44. Period of Construction and Status of Houses in the Major Redevelopment Districts	176
45. House Quality and Site Characteristics of Existing and Replaced Properties in the Major Redevelopment Districts	178
46. Occupancy Type, Length of Ownership, Number of Owners and Site Characteristics of Existing and Replaced Properties in the Major Redevelopment Districts	180
47. Walk-Up Apartment Site Selection and Housing Characteristics of Existing and Replaced Properties Along the Major Arterials	182
48. Summary of Site Selection and Apartment Redevelopment Through Time for the Major Arterials and Redevelopment Districts	184



## LIST OF FIGURES

Figure	Page
1. The 1951 Built-Up Area	6
2. Census Enumeration Areas	10
3. Physical Expansion of Edmonton	22
4. Transition Pattern, 1971	37
5. Spatial Development of a Hypothetical Transition Pattern	45
6. Distribution of Converted Dwellings, 1921	48
7. Distribution of Converted Dwellings, 1931	49
8. Distribution of Converted Dwellings, 1941	50
9. Location of Conversion Activity, 1932-1941	52
10. Distribution of Converted Dwellings, 1951	53
11. Location of Conversion Activity, 1942-1951	54
12. Distribution of Converted Dwellings, 1961	55
13. Location of Conversion Activity, 1952-1961	57
14. Distribution of Converted Dwellings, 1971	58
15. Location of Conversion Activity, 1962-1971	59
16. Distribution of Multiple-Family Converted Dwellings, 1941-1971	61
17. Location of Multiple-Family Conversion Activity, 1932-1971	62
18. Distribution of Upper-Storey Converted Dwellings, 1941-1971	64





Figure	Page
19. Location of Upper-Storey Conversion Activity, 1932-1971	65
20. Distribution of Basement Converted Dwellings, 1941-1971	66
21. Location of Basement Conversion Activity, 1932-1971	67
22. Location of Reconversion Activity, 1962-1971	70
23. Distribution of Dwelling Units Added by Redevelopment to 1961	73
24. Location of Redevelopment Activity, 1952-1961	74
25. Distribution of Dwelling Units Added by Redevelopment to 1971	75
26. Location of Redevelopment Activity, 1962-1971	76
27. Distribution of Dwelling Units Added by Walk-Up and High Rise Apartment Redevelopment to 1961	79
28. Location of Walk-Up and High Rise Apartment Redevelopment Activity, 1952-1961	80
29. Distribution of Dwelling Units Added by Walk-Up and High Rise Apartment Redevelopment to 1971	81
30. Location of Walk-Up and High Rise Apartment Redevelopment Activity, 1962-1971	82
31. Spatial Development of the Edmonton Transition Pattern, 1941-1971	85
32. Sequence of Change in the 1951 Built-Up Area, 1921-1971	109
33. Spatial Framework for Correlation Analysis	119
34. Spatial Framework for Correlation Analysis	120



Figure	Page
35. Spatial Framework for Correlation Analysis	121
36. Apartment Redevelopment Study Areas	152
37. Spatial Framework for Correlation Analysis	158
38. Spatial Development of a Transition Pattern	199
39. Stage Development of Residential Areas in Transition	202



## INTRODUCTION

"The modern city is a dynamic organism constantly in process of evolution."<sup>1</sup> Although written nearly forty years ago, the premise of this statement is still valid: vast and complex changes mark the current development of American and Canadian cities.<sup>2</sup> Rapid advances in technology, combined with changes in social and economic requirements for space and location, have created new patterns in the internal structure of the city.<sup>3</sup> Nowhere is this more apparent than in the older residential districts, but here change appears as a juxtaposition. Areas of apartment redevelopment can be contrasted to neighbourhoods where obsolescence, decay or

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<sup>1</sup>C. C. Colby, "Centrifugal and Centripetal Forces in Urban Geography," Annals, Association of American Geographers, vol. 23, 1933, p. 1.

<sup>2</sup>H. M. Mayer, "Spatial Change Inside the American City," in S. B. Cohen, ed., Problems and Trends in American Geography, New York, Basic Books, 1967, pp. 47-63.

<sup>3</sup>For generalized discussion of these shaping forces see B. Chinitz, ed., City and Suburb: The Economics of Metropolitan Growth, Englewood Cliffs, Prentice-Hall, 1964, pp. 3-52; E. M. Hoover, "The Evolving Form and Organization of the Metropolis," in H. S. Perloff and L. Wingo, Jr., eds., Issues in Urban Economics, Baltimore, The Johns Hopkins University Press, 1968, pp. 237-284; and E. L. Ullman, "The Nature of Cities Reconsidered," Papers and Proceedings of the Regional Science Association, vol. 9, 1962, pp. 7-23.





conversion is the mode of change. In short, the whole city, to varying degrees, is in transition—"everything is in process of change."<sup>4</sup>

Yet, despite the obvious transformation in the forms and patterns of cities, little geographic research has been addressed to the problem of understanding the characteristics, processes and causes of urban change. Simmons, for example, has stated that "urban geographers can now begin to ask how particular patterns and associations emerge... . Studies of urban areas over time...are needed."<sup>5</sup> As the largest consumer of urban space, the changing residential sector of the city warrants immediate attention, not only for contributing to a theory of urban growth and change, but also for contributing much needed information to the urban planning process. Existing studies of residential areas over time generally lack reference to process, and therefore explanation and the development of theory has been impeded. Moreover, predictions of change are central to planning procedures, and studies of neighbourhoods in transition can yield valuable information about potential problems. For example, what sequence of change is likely to occur when a

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<sup>4</sup>J. O. M. Broek and J. W. Webb, A Geography of Mankind, New York, McGraw-Hill, 1968, p. 19.

<sup>5</sup>J. W. Simmons, Urban Geography in Canada," The Canadian Geographer, vol. 11, 1967, p. 349.



single-family housing area is rezoned for higher-density residential use? What effect will this sequence have on the provision of community facilities such as schools, open space or utilities? The examination of residential areas in transition, with which this research is concerned, thus has both a theoretical and practical rationale.

### PROCESS STUDIES AND THE GEOGRAPHIC ANALYSIS OF CHANGE

Morrill has written that human geography may be approached in at least three distinct ways: "to understand the uniqueness of a place or region; to discover the relation of man and environment; or to systematically explain location and interaction."<sup>6</sup> The last approach is adopted in this study of residential areas in transition. Basic research themes which seek to explain the location and relations of phenomena in change therefore include: discussion of changing spatial distributions and associations; examination of the changing character of an area through a series of stages; and analysis of the processes which shape spatial patterns and the sequential development of areas.

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<sup>6</sup>R. L. Morrill, The Spatial Organization of Society, Belmont, California, Wadsworth, 1970, p. 3.





Several of these themes, and others, have long been the preserve of the historical geographers.<sup>7</sup> Their studies have described the ways in which patterns and areas, for example, have changed over time. Cross-sectional and longitudinal analyses are the favoured methods of measurement. However, these studies generally have not explained how and why these patterns and areas have changed. That is, processes have often been assumed but seldom analyzed: "our knowledge of the nature of processes shaping patterns through time is no better than rudimentary,"<sup>8</sup> This deficiency has caused Harvey to plead that "we need to understand the processes of change over space and time... . These processes are

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<sup>7</sup>For discussion on themes and approaches in historical geography see for example A. R. H. Baker, et al., eds., Geographical Interpretation of Historical Sources, London, Barnes and Noble, 1970, 458 pp.; A. H. Clark, "Geographical Change as a Theme for Economic History," Journal of Economic History, vol. 20, 1960, pp. 607-613; H. C. Darby, "On the Relations of Geography and History," Transactions, Institute of British Geographers, No. 19, 1953, pp. 1-13; J. A. Jakle, "Time, Space, and the Geographic Past," American Historical Review, vol. 76, 1971, pp. 1084-1103; C. O. Sauer, "Forward to Historical Geography," Annals, Association of American Geographers, vol. 31, 1941, pp. 1-20; and C. T. Smith, "Historical Geography: Current Trends and Prospects," in R. J. Chorley and P. Haggett, eds., Frontiers in Geographical Teaching, London, Methuen, pp. 118-146. The most thorough treatment of the field of historical geography, with a very detailed bibliography of study examples, is by H. C. Prince, "Real, Imagined and Abstract Worlds of the Past," in C. Board, et al., eds., Progress in Geography, vol. 3, London, Edward Arnold, 1971, pp. 1-86.

<sup>8</sup>Prince, op. cit., p. 22.



critical to our understanding of present day patterns; they mould and create them."<sup>9</sup> Process studies, which analyze the particular methods or mechanisms by which phenomena are transformed from one state to another, are clearly necessary for the advancement of geographic explanation and theory.<sup>10</sup> A significant contribution can therefore be made by analyzing the processes of change which have created residential areas in transition.

### RESIDENTIAL AREAS IN TRANSITION

In urban research to date, just one part of the city has been popularly identified as a transition area; it was first described during the 1920s by Burgess when he presented his

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<sup>9</sup>D. Harvey, "Models of the Evolution of Spatial Patterns in Human Geography," in P. Haggett and R. J. Chorley, eds., Models in Geography, London, Methuen, p. 550.

<sup>10</sup>Discussions on the nature of geography which emphasize the need for studies of processes of change include: E. A. Ackerman, Geography as a Fundamental Research Discipline, Research Paper No. 58, Department of Geography, University of Chicago, 1958, 37 pp.; J. M. Blaut, "Space and Process," Professional Geographer, vol. 13, 1961, pp. 1-7; J. Eichenbaum, "Form, Function, and Process: A Methodological Inquiry," Economic Geography, vol. 47, 1971, pp. 525-544; R. G. Golledge, Process Approaches to the Analysis of Human Spatial Behavior, Discussion Paper No. 16, Department of Geography, Ohio State University, 1970, 35 pp.; and D. Harvey, Explanation in Geography, London, Edward Arnold, 1969, pp. 407-432.



concentric zone model of urban growth:<sup>11</sup>

"Surrounding the Central Business District are areas of residential deterioration caused by the encroaching of business and industry... . This may therefore be called a Zone in Transition, with a factory district for its inner belt and an outer ring of retrogressing neighbourhoods, of first-settlement immigrant colonies, of rooming-house districts, of homeless-men areas... . In this area of physical deterioration...[is] the greatest concentration of cases of poverty, bad housing..."<sup>12</sup>

Since then discussions or references to this zone have appeared in various sociological studies, particularly by Chicago School<sup>13</sup>

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<sup>11</sup>E. W. Burgess, "The Growth of the City: An Introduction to a Research Project," in R. E. Park et al., The City, Chicago, University of Chicago Press, 1925, pp. 47-62; and idem, "Urban Areas," in T. V. Smith and L. W. White, eds., Chicago: An Experiment in Social Science Research, Chicago, University of Chicago Press, 1929, pp. 113-118.

<sup>12</sup>Burgess, "Urban Areas," op. cit., pp. 114-116.

<sup>13</sup>See for example J. F. Short, ed., The Social Fabric: Contributions of the Chicago School of Urban Sociology, Chicago, University of Chicago Press, 1971, 320 pp.; G. A. Theodorson, ed., Studies in Human Ecology, New York, Harper and Row, 1961, 626 pp.; and H. W. Zorbaugh, The Gold Coast and the Slum, Chicago, University of Chicago Press, 1929, pp. 17-45. For more recent analyses see: R. G. Krohn and R. Tiller, "Landlord-Tenant Relations in a Declining Montreal Neighbourhood," in P. Halmos, ed., Sociological Studies in Economics and Administration, Monograph No. 14, Keele, University of Keele Press, 1969, pp. 5-32; A. A. Nevitt, "Some Economic and Social Aspects of Twilight Area Housing," in ibid., pp. 33-46; and J. A. Rex, "The Sociology of a Zone in Transition," in R. E. Pahl, ed., Readings in Sociology, Toronto, Pergamon, 1968, pp. 211-231.





members, in the seminal studies of Hoyt<sup>14</sup> and Firey,<sup>15</sup> and more recently in Hoover and Vernon's comprehensive study of the New York metropolitan area.<sup>16</sup> However, the most detailed and comprehensive interpretation of this zone has only recently been offered by Preston.<sup>17</sup>

These studies, then, have been concerned only with that transition area which surrounds the central business district.<sup>18</sup> But the question can fairly be asked: Are there not other parts of the city

<sup>14</sup>H. Hoyt, The Structure and Growth of Residential Neighbourhoods in American Cities, Washington, United States Government Printing Office, 1939, 189 pp.

<sup>15</sup>W. Firey, Land Use in Central Boston, Cambridge, Harvard University Press, 1947, 268 pp.

<sup>16</sup>E. M. Hoover and R. Vernon, Anatomy of a Metropolis, New York, Doubleday, 1959, 338 pp.

<sup>17</sup>R. E. Preston, "The Zone in Transition: A Study in Land Use Patterns," Economic Geography, vol. 42, 1966, pp. 236-260; idem, "A Detailed Comparison of Land Use in Three Transition Zones," Annals, Association of American Geographers vol. 58, 1968, pp. 461-484; idem, "Transition Zone Structure: The Three-Sector Hypothesis," Town Planning Review, vol. 39, 1968, pp. 235-250; and idem and D. Griffin, "A Restatement of the Transition Zone Concept," Annals, Association of American Geographers, vol. 56, 1966, pp. 339-350.

<sup>18</sup>L. S. Bourne, "Comments on the Transition Zone Concept," Professional Geographer, vol. 20, 1968, pp. 313-316.



which are in a state of transition? The answer must be yes, especially if we accept the premise that everything is in process of change. What, then, are residential areas in transition? Where are they located and how have they been formed?

By definition, residential areas in transition are in a state of change.<sup>19</sup> Their physical, functional and social characteristics are being altered. Processes of change, including the invasion and succession of different population groups and land use activities, the conversion of houses to higher-density use, redevelopment, and filtering, are the main mechanisms inducing change in the structure of transition areas. These transition processes have long been believed to occur in the inner-city residential areas; that they take place in other neighbourhoods has been recognized too, but to a much lesser extent.<sup>20</sup> But recent evidence, upon which the present study builds, suggests that change is spread throughout much of the residential sector, especially in older districts and near major

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<sup>19</sup>Transition areas may also be defined as "buffer" zones lying between areas of relatively homogeneous character. This interpretation will not be used in this research.

<sup>20</sup>See for example D. Kerr and J. Spelt, The Changing Face of Toronto, Memoir No. 11, Ottawa, Geographical Branch, Department of Mines and Technical Surveys, 1965, pp. 112-128; and P. J. Smith, "Change in a Youthful City: The Case of Calgary, Alberta," Geography, vol. 56, 1971, pp. 1-14.





institutional and business centres.<sup>21</sup>

## CONTRIBUTIONS TO TRANSITION THEORY

A theory of residential areas in transition should necessarily contain explanations of both the changing social make-up and the changing physical morphology of residential areas. These are the two essential components of residential structure. To this end, the most significant contributions to transition theory have been made by sociologists, who have long paid attention to the changing social mosaic of the city.<sup>22</sup> Although their studies do contain descriptions of spatial patterns and directions of change (which are of intrinsic interest to geographers), they lack a spatial approach. Geographers, however, have only recently become interested in the changing social topography of urban space,<sup>23</sup> and their contributions to transition theory have, accordingly, been of lesser importance. In contrast to the studies of social change, the changing physical

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<sup>21</sup>L. D. McCann, "Processes of Change in Residential Areas in Transition," unpublished M.A. thesis, University of Alberta, 1969, 204 pp.

<sup>22</sup>D. W. G. Timms, The Urban Mosaic, Cambridge, Cambridge University Press, 1971, 277 pp.

<sup>23</sup>R. J. Johnston, Urban Residential Patterns, London, Bell, 1971, 383 pp.



fabric has been neglected by geographers and other social scientists alike. From a review of the transition literature, then, it will be possible to develop research themes which are appropriate for geographic analysis and which will contribute to transition theory.

The Burgess model of urban growth and structure contains the first theoretical propositions specifically referring to transition neighbourhoods.<sup>24</sup> According to Burgess, the city is arranged in a series of five concentric zones. From the centre to the periphery, there is the central business district, the zone in transition, the zone of independent workingmen's homes, the zone of better residences and the commuters' zone. Each zone "...extend[s] its area by the invasion of the next outer zone."<sup>25</sup> As more intensive land uses replace less intensive uses in a process of succession, transition areas develop where the boundaries of the different zones meet. In this manner, single-family homes are converted to multiple-occupancy and the original residents are replaced by lower

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<sup>24</sup>References to changes in the character of residential areas can be found in many earlier studies, but they do not make explicit reference to actual transition processes. See for example R. M. Hurd, Principles of City Land Values, New York, Record and Guide, 1903, pp. 75-88; and A. B. Wolfe, The Lodging House Problem in Boston, Cambridge, Harvard University Press, 1913, 200 pp.

<sup>25</sup>Burgess, "The City," op. cit., p. 49.



income groups in an outward progression from the city's centre.<sup>26</sup> Change is thus directly related to the age of the housing stock and the growth pattern of the city. The primary change mechanism recognized by Burgess was the process of succession; however, he did not clearly specify the cycle of change that a transition neighbourhood might pass through.

In The Structure and Growth of Residential Neighbourhoods, Hoyt refers specifically to the transition process: "... the forces that determine the speed of neighbourhood transition..." and "...there is a quick and sudden transition in the land uses or residential occupancy of an area."<sup>27</sup> There is remarkable similarity between Hoyt's and Burgess's interpretation of the direction and movement of change:

"In a growing city, changing land uses begin at the centre... . In their process of growth, these uses press outwards and impinge upon other types of land use of less intensity, forcing them in turn, to thrust outwards into the next encircling belt of land uses."<sup>28</sup>

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<sup>26</sup>Converted dwellings are mentioned to exist in the zone in transition and in the zone of workingmen's homes (the two-flat area), while in the zone of better residences, "...once communities of single-family homes, these are becoming in Chicago apartment-house and residential hotel areas." Burgess, "Urban Areas," op. cit., p. 116.

<sup>27</sup>Hoyt, op. cit., p. 81.

<sup>28</sup>Ibid.





What contrasts Hoyt's interpretation of city growth with other studies is his more detailed elaboration of change processes, the different types of changing neighbourhoods, and the location and movement of change. Filtering is the main process causing change in the occupancy of neighbourhoods,<sup>29</sup> while redevelopment of single-family homes is the primary agent of physical change.<sup>30</sup> The conversion of dwellings to higher-density use is largely ignored. Change, while moving outward in concentric fashion, is sectorally differentiated according to the original character of the neighbourhood. For example, a high-rent sector of large single-family homes could easily change to multiple-family occupancy, whereas a low rent sector, containing only smaller sized housing, would be less susceptible.<sup>31</sup>

Hoyt also offered explanations for the occurrence of neighbourhood change. The rate and amount of city population

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<sup>29</sup>"The influx of newcomers causes a shifting and filtering process that profoundly affects every neighbourhood in the city. Many of the old residents move to new and more attractive homes... , while many of the new arrivals enter old neighbourhoods and occupy homes abandoned by the previous occupants." *Ibid.*, pp. 81-82.

<sup>30</sup>*Ibid.*, pp. 82, 96-97, 99, 105, 111 and 118.

<sup>31</sup>Unfortunately, because Hoyt was dealing mainly with the movement of high rent areas, the internal differentiation of changing areas is not fully explored. However, it is treated in: Firey, op. cit.



growth was stressed as the principal determinant, while various local forces, such as deed restrictions, the presence of nearby industry, the character of a neighbourhood's residents, natural barriers and types of buildings, affected the rate and direction of residential change.

Neither Burgess nor Hoyt clearly formulated the sequence of change that particular neighbourhoods might evolve through; this shortcoming was addressed by Hoover and Vernon in Anatomy of a Metropolis.<sup>32</sup> Their model postulates five stages of development, beginning with an initial stage in which single-family houses are constructed. This gives way eventually to a transition stage with substantial population growth generated by the construction of apartments, partly infilling the area and partly replacing older single-family houses. There is then a down-grading stage with little new construction but much conversion and subdivision of the existing houses and apartments so that the density of use continues to increase. Beyond this peak there is a thinning-out stage, when population density and dwelling occupancy decline as a result of diminishing household size, rising vacancy rates, and abandonment and demolition of dwellings. Finally, in a renewal stage, the

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<sup>32</sup> Hoover and Vernon, op. cit.



obsolete housing is completely replaced by new multiple-housing forms, mainly in public redevelopment schemes.

This model represents the most significant contribution to understanding the sequence of land use and physical change in residential transition areas. However, as it was based primarily on static data and the few time-series and small-area statistics which were available, it remains conjectural.<sup>33</sup>

These major contributions to transition theory have prompted other studies of residential change. But in these studies there has been a decided imbalance towards examination of the social sector alone; physical and functional changes have not been systematically treated. In particular, the changing ethnic composition and stages in the social occupance of transition areas have been looked at

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<sup>33</sup>A recent study has attempted to empirically validate the Hoover-Vernon model; however, it fails to recognize either the conversion or the redevelopment processes, primarily because census data, upon which it was based, lacks this information. See D. L. Birch, "Toward a Stage Theory of Urban Growth," Journal, American Institute of Planners, vol. 37, 1971, pp. 78-87. For an earlier attempt, also based on census data, see B. Duncan, G. Sabagh, and M. van Arsdol, Jr., "Patterns of City Growth," American Journal of Sociology, vol. 67, 1962, pp. 418-429.





in great detail.<sup>34</sup> Other studies relevant to understanding social transition are those describing the emergence of distinct types of residential environment,<sup>35</sup> suburban population growth and central city decline,<sup>36</sup> the redistribution and spatial mobility of selected

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<sup>34</sup>P. F. Cressy, "Population Succession in Chicago, 1898-1930," American Journal of Sociology, vol. 44, 1938, pp. 59-69; O. D. Duncan and B. Duncan, The Negro Population of Chicago: A Study of Residential Succession, Chicago, University of Chicago Press, 1957, 367 pp.; R. G. Ford, "Population Succession in Chicago," American Journal of Sociology, vol. 56, 1950, pp. 56-60; W. F. Smith, "Forecasting Neighbourhood Change," Land Economics, vol. 39, 1963, pp. 292-297; K. E. Taeuber and A. F. Taeuber, Negroes in Cities: Residential Segregation and Neighbourhood Change, Chicago, Aldine, 1965, 285 pp.; E. P. Wolf, "The Invasion-Succession Sequence as a Self-Fulfilling Prophecy," Journal of Social Issues, vol. 13, 1957, pp. 7-20; and *idem*, "Racial Transition in a Middle-Class Area," Journal of Intergroup Relations, vol. 1, 1960, pp. 75-81.

<sup>35</sup>D. Doeppers, "The Globeville Neighbourhood in Denver," Geographical Review, vol. 57, 1967, pp. 506-522; R. L. Morrill, "The Negro Ghetto: Problems and Alternatives," Geographical Review, vol. 55, 1965, pp. 339-361; H. M. Rose, "The Development of an Urban Subsystem: The Case of the Negro Ghetto," Annals, Association of American Geographers, vol. 60, 1970, pp. 1-17; *idem*, "The Spatial Development of Black Residential Subsystems," Economic Geography, vol. 48, 1972, pp. 43-65; and D. Ward, "The Emergence of Central Immigrant Ghettos in American Cities: 1840-1920," Annals, Association of American Geographers, vol. 58, 1968, pp. 343-359.

<sup>36</sup>D. L. Birch, The Economic Future of City and Suburb, New York Committee for Economic Development, 1970, 41 pp.; H. Blumenfeld, "The Tidal Wave of Metropolitan Expansion," Journal, American Institute of Planners, vol. 20, 1954, pp. 3-14; W. M. Dobriner, ed., The Suburban Community, New York, G. P. Putnam, 1958, 445 pp.; and J. den Draak, "The Diminishing Residential Function of the Inner City," in W. F. Heinemeijer *et al.*, eds., Urban Core and Inner City, Lieden, E. J. Brill, 1967, pp. 103-117.



population groups,<sup>37</sup> and changing population densities and household occupancy patterns.<sup>38</sup> Recent studies have emphasized the changing social topography of intra-urban space.<sup>39</sup>

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<sup>37</sup>R. R. Boyce, "Residential Mobility and Its Implications for Urban Spatial Change," Proceedings, Association of American Geographers, vol. 1, 1969, pp. 22-25; J. A. Jakle and J. O. Wheeler, "The Changing Residential Structure of the Dutch Population in Kalamazoo, Michigan," Annals, American Association of Geographers, vol. 59, 1969, pp. 441-460; R. J. Johnston, "Processes of Change in the High Status Residential Areas of Christchurch, 1951-1964," New Zealand Geographer, vol. 25, 1969, pp. 1-16; P. N. Jones, "Some Aspects of the Changing Distribution of Coloured Immigrants in Birmingham, 1961-1966," Transactions, Institute of British Geographers, No. 51, 1971, pp. 199-219; and J. W. Simmons, "Changing Residence in the City," Geographical Review, vol. 60, 1970, pp. 622-651.

<sup>38</sup>B. J. L. Berry, J. W. Simmons and R. J. Tennant, "Urban Population Densities: Structure and Change," Geographical Review, vol. 53, 1963, pp. 389-405; P. W. Cave, "Occupancy Duration and the Analysis of Residential Change," Urban Studies, vol. 6, 1969, pp. 58-69; and H. C. White, "Multipliers, Vacancy Chains and Filtering," Journal, American Institute of Planners, vol. 37, 1971, pp. 88-94.

<sup>39</sup>L. A. Brown and F. E. Horton, "Social Area Change: An Empirical Analysis," Urban Studies, vol. 7, 1970, pp. 271-288; P. G. Goheen, Victorian Toronto, 1850 to 1900: Pattern and Process of Growth. Research Paper No. 127, Department of Geography, University of Chicago, 1970, 278 pp.; K. E. Haynes, "Spatial Change in Urban Structure: Alternative Approaches to Ecological Dynamics," Economic Geography, vol. 47, 1971, pp. 324-335; A. Hunter, "The Ecology of Chicago, 1930 to 1960: Persistence and Change," American Journal of Sociology, vol. 77, 1971, pp. 425-444; R. A. Murdie, Factorial Ecology of Metropolitan Toronto, 1951-1961, Research Paper No. 116, Department of Geography, University of Chicago, 1969, 212 pp.; and F. L. Sweetser, Patterns of Change in the Social Ecology of Metropolitan Boston, Boston, Massachusetts Department of Mental Health, 1962, 158 pp.



In comparison, the changing morphology of residential areas has received little attention. Studies have focused mainly on the physical expansion of cities without consideration of internal reconstruction.<sup>40</sup> Those viewing change in the built-up morphology have looked primarily at the condition and aging of the housing stock.<sup>41</sup> Urban renewal studies may be grouped within this

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<sup>40</sup>J. S. Adams, "Residential Structure of Midwestern Cities," Annals, Association of American Geographers, vol. 60, 1970, pp. 37-62; M. K. Bridger and B. Greer-Wooten, "Landscape Components and Residential Urban Growth in Western Montreal Island," Revue de Geographie de Montreal, vol. 19, 1965, pp. 78-90; A. Mabogunje, "The Growth of the Residential Districts of Ibadan," Geographical Review, vol. 52, 1962, pp. 56-77; B. T. Robson, "An Ecological Analysis of the Evolution of Residential Areas in Sunderland," Urban Studies, vol. 3, 1966, pp. 120-142; and S. B. Warner, Streetcar Suburbs, Cambridge, Harvard University Press, 1962, 208 pp.

<sup>41</sup>D. W. Drakakis-Smith, "Substandard Housing in Welsh Towns," in H. Carter and W. K. D. Davies, eds., Urban Essays, London, Longman, 1970, pp. 49-65; T. A. Hartshorn, "Inner City Residential Structure and Decline," Annals, Association of American Geographers, vol. 61, 1971, pp. 72-96; D. A. Kirby, "The Inter-War Council Dwelling: A Study of Residential Obsolescence and Decay," Town Planning Review, vol. 42, 1971, pp. 250-268; C. A. Maher, "Age, Land Use Admixture and Housing Quality," New Zealand Geographer, vol. 25, 1969, pp. 54-58; F. Medhurst and J. Parry Lewis, Urban Decay: Analysis and Policy, London, Macmillan, 1969, 174 pp.; and R. Vernon, "Some Reflections on Urban Decay," Confluence, vol. 7, 1958, pp. 128-140.







category.<sup>42</sup> Reports from real estate and housing economists have contributed information about aggregate changes in the housing stock and statements about the life-cycle of individual buildings, but these lack a spatial dimension.<sup>43</sup> It is only recently that selected aspects of the residential land use succession process, and in particular of

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<sup>42</sup>W. Alonso, "The Historic and Structural Theories of Urban Form: Their Implications for Urban Renewal," Land Economics, vol. 40, 1963, pp. 227-231; M. Colean, Renewing Our Cities, New York, The Twentieth Century Fund, 1953, 181 pp.; O. Davis and A. B. Winston, "The Economics of Urban Renewal," Law and Contemporary Problems, vol. 36, 1961, pp. 105-117; S. Greer, Urban Renewal and American Cities, New York, Bobbs-Merrill, 1965, 201 pp.; C. Rapkin and W. G. Grigsby, Residential Renewal in the Urban Core, Philadelphia, University of Philadelphia Press, 1960, 131 pp.; P. N. Troy, ed., Urban Redevelopment in Australia, Canberra, Research School of Social Sciences, Australian National University, 1967, 441 pp.; and C. Woodbury, ed., Urban Redevelopment: Problems and Practices, Chicago, University of Chicago Press, 1953, 468 pp.

<sup>43</sup>M. Colean, op. cit.; E. M. Fisher and R. M. Fisher, Urban Real Estate, New York, Henry Holt, 1954, pp. 333-354; B. J. Frieden, The Future of Old Neighbourhoods, Cambridge, M.I.T. Press, 1964, 209 pp.; W. Lean and B. Goodall, Aspects of Land Economics, London, The Estates Gazette, 1966, pp. 179-184; F. G. Mittlebach, The Changing Housing Inventory: 1950-1959, Research Report No. 4, Real Estate Research Program, Los Angeles, University of California Press, 1963, 33 pp.; W. Smith, The Low Rise Speculative Apartment, Research Report No. 25, Centre for Real Estate and Urban Economics, University of California, 1964, 132 pp.; and idem, Housing, Berkeley, University of California Press, 1970, 511 pp.



apartment redevelopment activity, have been studied.<sup>44</sup> The nature of the dwelling conversion process remains largely neglected,<sup>45</sup> while the temporal sequence of land use and physical change in transition areas still remains unexplored.<sup>46</sup>

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<sup>44</sup>L. S. Bourne, Private Redevelopment of the Central City, Research Paper No. 112, Department of Geography, University of Chicago, 1967, 199 pp.; *idem*, "Market, Location, and Site Selection in Apartment Construction," The Canadian Geographer, vol. 12, 1968, pp. 211-226; *idem*, "Location Factors in the Redevelopment Process: A Model of Residential Change," Land Economics, vol. 45, 1969, pp. 183-193; *idem*, "Trends in Urban Redevelopment: The Implications for Urban Form," Appraisal Journal, vol. 37, 1970, pp. 24-36; *idem*, "Physical Adjustment Processes and Land Use Succession: A Conceptual Review and Central City Example," Economic Geography, vol. 47, 1971, pp. 1-15; J. Gayler, "Private Residential Redevelopment in the Inner City: The West End of Vancouver, Canada," Journal of the Town Planning Institute, vol. 57, 1971, pp. 15-20; and D. G. Janelle, "Surface Motions: A Key to Isolating Changes in Urban Land Use," Proceedings, Association of American Geographers, vol. 3, 1971, pp. 86-90.

<sup>45</sup>This is not to imply that dwelling conversion has not been studied; rather, it has lacked in depth examination, usually only receiving limited discussion within the larger context of city evolution. See for example B. T. Robson, Urban Analysis: A Study of City Structure, Cambridge, Cambridge University Press, 1969, pp. 108-110.

<sup>46</sup>P. J. Smith and L. D. McCann, The Sequence of Change in Residential Areas in Transition, Department of Geography, University of Alberta, 1971, 33 pp. (Mimeographed)



## THE RESEARCH PROBLEM

What clearly emerges from the literature on residential change is a lack of information about the functional and physical changes which actually take place within the existing residential areas. This deficiency can be emphasized by posing certain questions. Where, throughout the residential areas, is land use and physical change located? Through time, what is the spatial movement and directional bias of these changes? Is there a particular sequence of land use and physical change in the evolutionary development of a transition area? What is the nature of the conversion and redevelopment processes which induce change in transition area structure? And, how do the housing characteristics of residential areas influence these processes? While these questions have received some attention and partial answers in the literature, there has not been a systematic study of the land use and physical changes which occur within a city's residential districts. This study attempts to fill this gap.

### Objectives of the Study

Because knowledge of the changing morphology of residential areas in transition is limited, and because there is a definite need in urban research for studies of processes of change,





this thesis seeks to determine how the dwelling conversion and apartment redevelopment processes characterize the spatial and sequential development of transition areas. More specifically, the residential morphology of Edmonton's 1951 built-up area will be examined for the period 1921 to 1971 to determine (1) the spatial evolution of the transition pattern as characterized by conversion and redevelopment; (2) the cycle of land use and physical changes that transition areas undergo; and (3) the association between housing characteristics and transition area development, particularly the location, types and amount of conversion and redevelopment. A fourth and overriding objective is the formulation of a spatio-temporal model of the changing physical morphology of residential areas in transition.

Spatial Development of Transition Areas. The first research objective will be met through an empirical analysis of the spatial evolution of the transition pattern. This will be done by tracing the distribution, directional bias and spatial movement through time of conversion and redevelopment activity. Based on the existing literature, especially the Burgess and Hoyt concepts of urban structure, a descriptive model of spatial development is outlined and then tested against the Edmonton data.

Sequential Development of Transition Areas. The second research objective focuses on the cycle of land use and physical changes that



transition areas undergo, and in particular on the Hoover-Vernon model of neighbourhood evolution. Their model may well be valid for New York and other large cities of comparable age, but recent evidence suggests that it does not provide an accurate description of the transition sequence which has emerged to date in western Canadian cities. In particular, private apartment redevelopment has intervened in the cycle long before government action has been needed, and dwelling conversion has emerged as a distinct phase before redevelopment. The relevance of the Hoover-Vernon model will be tested, then, by unravelling and describing the sequence of land use and physical changes which transition areas experience in the course of their development.

Residential Morphology and the Conversion and Redevelopment Processes. To show how the transition pattern is formed and why areas experience particular stages of growth, it is necessary to analyze the processes of change. In this study, a partial explanation of process is sought by measuring the relationship between housing characteristics and the location, types and amount of conversion and redevelopment. Other factors, including social, economic, political and technological conditions, affect these processes, but detailed examination of these factors is beyond the scope of this study. They



are referred to, though, throughout the text. To interpret the spatial expansion and pattern of conversion and redevelopment, areal and site correlates are measured for such variables as house age and period of construction, parcel and building size, construction quality and present condition, and house types. By also analyzing the sequence in which properties succumb to change, the temporal dynamics of the processes are evaluated.

#### A Model of the Changing Physical Morphology of Transition Areas.

This objective follows logically from the preceding three. After outlining the spatial and sequential development of transition areas, and analyzing the conversion and redevelopment processes, it will be possible to devise a spatio-temporal model of the changing morphology of transition areas. The spatial requirements of the model are that the directional bias and spatial movement through time of land use and physical change are explained by showing how the conversion and redevelopment processes shape the transition pattern. Guidelines for the temporal component have been outlined by Kuznets, who has specified requirements for a stage theory of economic growth.<sup>47</sup> These guidelines are nevertheless directly applicable to

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<sup>47</sup>S. Kuznets, Economic Growth and Structure, New York, Norton, 1965, pp. 213-216.





developing a stage model of transition area formation. These include (1) that the characteristics of each stage are unique to that stage alone, (2) that each stage should display empirically testable characteristics, and (3) that the relationship of each stage to its preceding or succeeding stage, through the identification of the formative processes (conversion and redevelopment) is well defined.<sup>48</sup>

## ORGANIZATION OF THE THESIS

Chapter I deals with the research methodology, particularly data collection techniques and selection of the 1951 built-up study area. Chapter II outlines the dimensions of land use and physical change which have occurred between 1921 and 1971. Major trends are identified and the morphology of the 1951 built-up area is described to place the subsequent analyses in a clearer perspective. The ways in which conversion and redevelopment processes have interacted through time and space to form a transition pattern is the subject of Chapter III. Then, in Chapter IV, the sequential development of residential areas in transition is described. The influence of residential morphology on the conversion and redevelopment processes is analyzed in Chapters V and VI.

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<sup>48</sup>Similar requirements are specified in Harvey, Explanation in Geography, op. cit., p. 425.



The final chapter presents a spatio-temporal model of the changing morphology of residential areas in transition.



## Chapter I

### METHODOLOGY

This study relies principally upon the real property records contained in the Assessor's Department of the City of Edmonton. These data are reliable, available to the researcher and provide measures of essential housing variables. They also comprise the only available information for analyzing land use and physical change. For certain analyses, though, assessment materials have been supplemented by information from the Census of Canada, the Civic Census, documents in the City Archives, and street directories. Interviews with city officials, developers and homeowners, as well as extensive field work, were also essential.

The methods and problems of collecting and organizing assessment data are discussed in this chapter.

### ASSESSMENT DATA

Assessment records contain detailed information on land use, building, land and ownership characteristics. They are available for both existing and replaced properties, which makes it possible to trace all the changes in the morphology of a transition area. In addition, they are referenced by parcels of land, each parcel being located by roll number, street address and block





front.<sup>1</sup> This facilitates the identification of precise locations for mapping and sampling procedures.

Two sets of data were required, one consisting of the construction date and land use history of every residential property in the city, and the other comprising detailed information on specific housing variables for a sample of properties. A complete housing age and land use history inventory was needed to reconstruct the spatial and sequential development of the transition pattern. Data requirements for these analyses are comprehensive and exacting. First, a complete building inventory of the city, available in a form which is directly usable and comparable through time, is necessary. Second, all new construction and land use and structural changes must be recorded. Third, past records must be available so that the characteristics of properties before they underwent change can be established.<sup>2</sup> These requirements were satisfied by carefully abstracting current and expired assessment files from various

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<sup>1</sup>The distinction among the terms lot, parcel of land and property should be stated. In common usage, a lot means the basic unit of subdivision in the land survey system. A parcel is a particular land holding represented by single ownership, and may include one lot or any part or combination of parts of lots. A property, on the other hand, consists of a parcel of land and the physical improvements existing on that land.

<sup>2</sup>The fact that these conditions are seldom met has probably restricted other attempts to examine the development of transition areas.



storage places. Approximately 90,000 residential properties were examined and the construction date and land use history of each was recorded.<sup>3</sup>

Detailed information on selected housing variables was needed to explain how housing characteristics influence the conversion and redevelopment processes. From previous research and a review of the relevant literature, it seemed that certain variables might indeed be important. The categories of the variables which were collected are listed in Table 1. Appendix A contains a detailed classification. This information was collected for over 12,500 residential properties.

## THE STUDY PERIOD

Data were collected to measure changes in the morphology of transition areas between 1921 and 1971. This fifty year span was chosen to observe the complete spatial and temporal evolution of transition area development and to observe the effects of the depression, the war years, and recent rapid economic and population growth on residential change. The time span will be broken into five ten-year periods.

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<sup>3</sup>In addition, about 12,000 non-residential properties were examined to see if a residence ever occupied their sites.



TABLE 1

CATEGORIES OF VARIABLES  
COLLECTED FROM ASSESSMENT RECORDS

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## LAND USE CHARACTERISTICS

Land use types

## BUILDING CHARACTERISTICS

House types

Architectural style

Basement type

Basement height

Construction quality

Age

Life expectancy

Size

Maintenance

Depreciation

Assessment value

## LAND CHARACTERISTICS

Size

Date occupied

Assessment value

## OWNERSHIP CHARACTERISTICS

Occupancy type

Length of ownership

Number of owners

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THE STUDY AREA

The areal extent of apartment construction is rigidly controlled by zoning which therefore defines the areas in which the





redevelopment process will be examined. These districts will be described in a later chapter. Assessment data were gathered for each of the nearly 5,800 properties which comprise these districts, and collection techniques ensured that all changes in the housing characteristics of each property were recorded.

Determining the boundary for examining the dwelling conversion process, and hence the outer boundary of an area in which all land use and physical changes could be studied, proved more vexing. Zoning, some specified amount of conversion activity, or morphological characteristics were possible criteria for boundary delimitation. The zoned conversion area was unsuitable because conversion is found throughout most of Edmonton, in apparent disregard for zoning regulations. An area based on some specified amount of conversion activity seemed equally unsatisfactory. As the mapping of dwelling conversion progressed, it became very apparent that age and types of dwellings affected the distribution of conversion, and thus the outer extent of transition processes. In short, conversion coincides closely with the 1951 built-up area (Figure 1). Choice of this study area has proven entirely satisfactory; it encompasses the zoned conversion area and all major concentrations of conversions. Because it proved impossible to collect detailed housing characteristics for all of the nearly 35,000



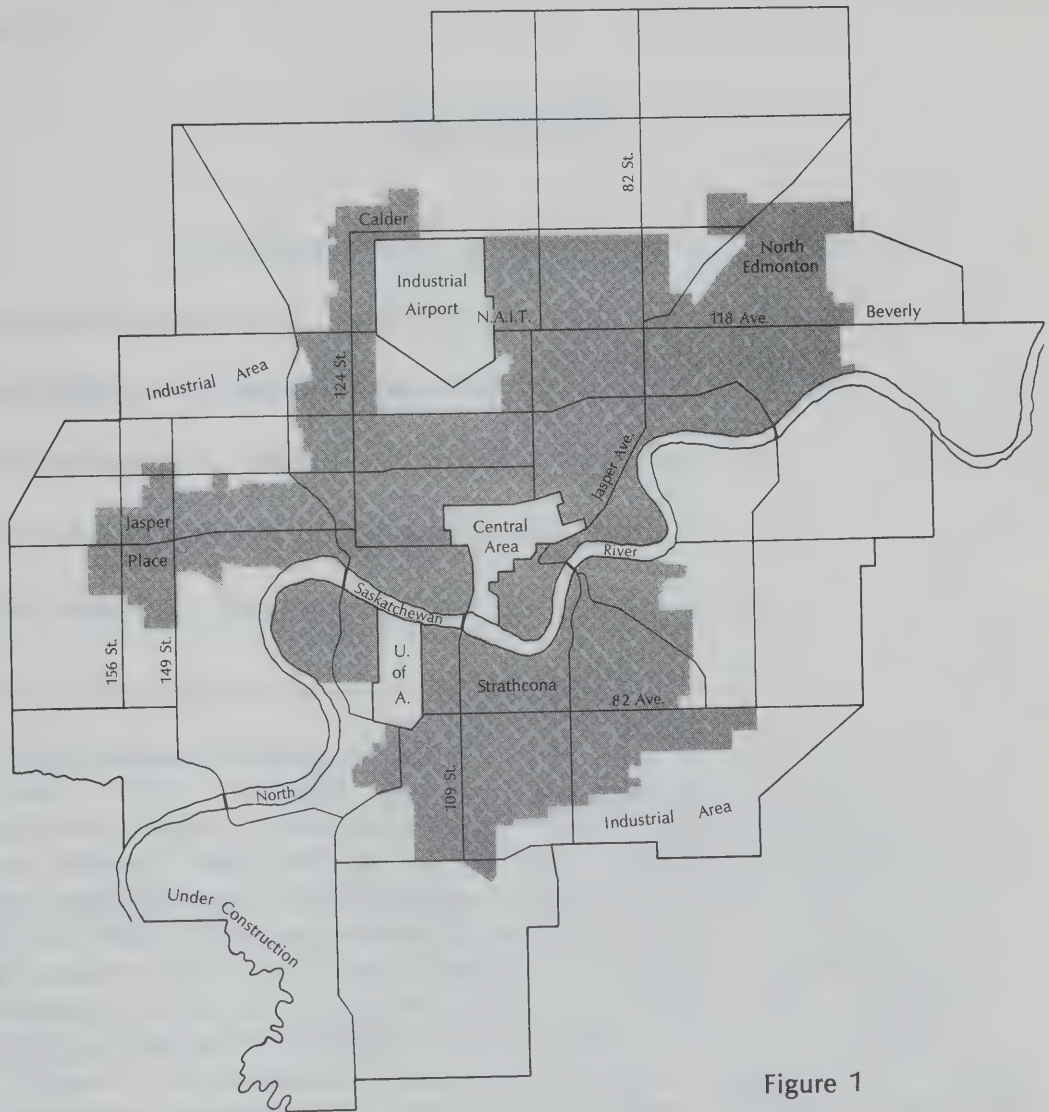


Figure 1  
THE 1951 BUILT-UP AREA

- Major Arterials
- - - Limit of Built-Up Area
- 1951 Built-Up Area

0 0.5 1 Mile



properties found within the 1951 area (other than their date of construction and land use history), housing information was necessarily sampled.

#### THE SAMPLE<sup>4</sup>

A twenty percent proportionate random sample of residential properties, stratified by census enumeration areas,<sup>5</sup> was employed. Choice of this size ensured a total sample of nearly 7,000 properties, which was feasible to collect in terms of the time available, and which also guaranteed a fairly accurate and representative sample. The sampling unit was the house and the parcel of

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<sup>4</sup>Texts which were used when developing the sampling procedure include: W. G. Cochran, Sampling Techniques, second edition, New York, Wiley, 1962, 244 pp.; L. Kish, Survey Sampling, New York, Wiley, 1965, 643 pp.; F. Yates, Sampling Methods for Censuses and Surveys, third edition, London, Griffin, 1960, 440 pp. Articles which discuss sampling problems within a geographical context include: B. J. L. Berry and A. M. Baker, "Geographical Sampling," in B. J. L. Berry and D. F. Marble, eds., Spatial Analysis, Englewood Cliffs, Prentice-Hall, 1968, pp. 91-100; J. Holmes, "Problems in Location Sampling," Annals, Association of American Geographers, vol. 57, 1967, pp. 757-780; idem, "The Theory of Plane Sampling and Its Application in Geographic Research," Economic Geography, vol. 46, 1970 (Supplement), pp. 379-392; and H. B. Rogers, "Random Sampling Techniques in Social Geography," Geographia Polonica, vol. 18, 1970, pp. 139-156.

<sup>5</sup>The boundaries of 1961 enumeration areas have been used. These and census enumeration area data were obtained from the Population Research Laboratory of the University of Alberta.





land the house occupied,<sup>6</sup> and an enumeration area was sampled if over 50 percent of its houses were constructed by 1951.<sup>7</sup> To coincide with 1961 census data (for example, for analyzing social and housing areal correlates of change), assessment records were recreated and sampled for that year. In addition, the sampling design also ensured that most information gathered would be representative for any year. For example, if a property sampled for 1961 had any previous or succeeding residence occupy its site, this information was collected. The sampling procedure was as follows.

(1) For all enumeration areas lying within the 1951 built-up area, the legal descriptions of each property were recorded.

(2) Using these legal descriptions, current and expired source cards containing land use, building, land and ownership information were gathered from the assessment files.

(3) The sampling frame and size in each enumeration area were determined by counting each residential property, assigning its construction date and land use history to specified categories. This

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<sup>6</sup>Apartment buildings, row and terrace housing, rooming houses and residential-commercial buildings were excluded from the sampling frame. However, data pertaining to their age, land use history and other variables were collected where applicable.

<sup>7</sup>Choice of the 50 percent criteria follows the suggestion made in J. P. Gibbs, "Methods and Problems in the Delimitation of Urban Units," in *idem*, ed., Urban Research Methods, Toronto, Nostrand, 1961, pp. 57-77.



master list can be used to check the accuracy of the sample. Special care was taken at this stage to record all conversions, redevelopments and other forms of land use change; this involved carefully checking the land use history cards for both residential and non-residential properties.

(4) From a list of random numbers generated by computer for various sample sizes, designated properties were sampled and their information coded on data processing sheets, ready for key-punching and subsequent computer analysis.

A total of 309 enumeration areas which lie within the 1951 built-up area were sampled (Figure 2). The average sample size is 23 properties, and comprehensive information is available for nearly 7,000 sampled properties.

#### DATA PROBLEMS: RECONSTRUCTING THE PAST

Assessment data are generally reliable and accurate, but they do possess certain limitations. One concerns identifying the date of dwelling conversion, which is usually given on either the building card or the land use record card (which dates from 1952). If no date was given for pre-1952 conversions, which occurred for less than 10 percent of these dwellings, it was necessary to check old assessment records and street directories at five-year intervals back to 1921 to determine when multiple-occupancy first took



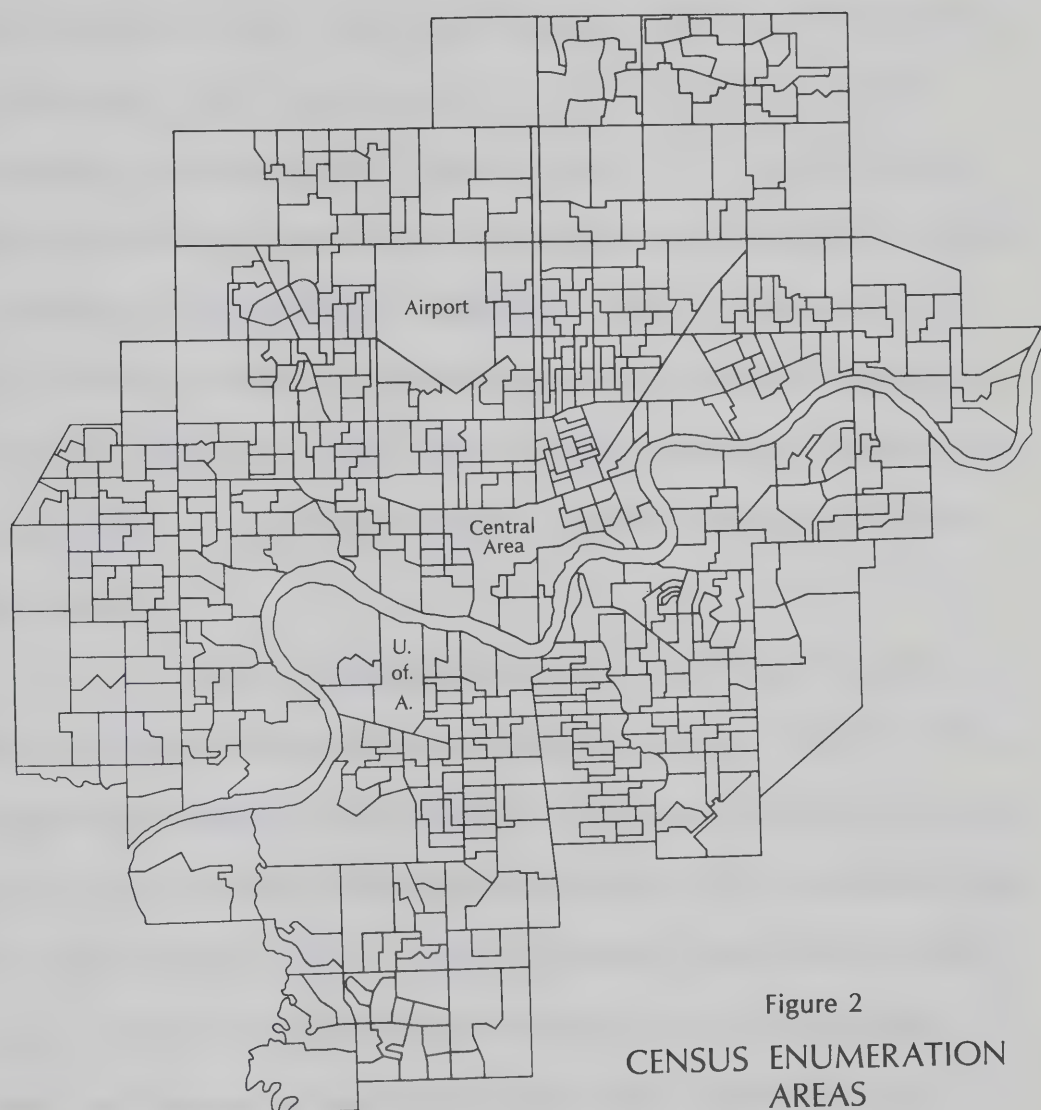


Figure 2  
CENSUS ENUMERATION  
AREAS

0 0.5 1 Mile

Source: Dominion Bureau of Statistics



place.<sup>8</sup> For example, if only one family resided at a dwelling's address in 1941, but two or more resided there in 1946, then the dwelling was considered converted as of 1946. If no indication of multiple-occupancy was found by using these sources, the dwelling was assigned a 1951 conversion date. This decision was taken because the land use status of each dwelling which appears on the 1952 land use record card was determined during a general reassessment between 1949 and 1951. A 1952 conversion, therefore, was likely converted in 1951. It should be stressed that the number of conversions reported to exist prior to 1951 is probably inexact; however, the effect of any inaccuracy is to slightly underestimate the actual number.

The other major problem concerns the attempt to record the date of construction and land use history of each existing and replaced residence. Unfortunately, the records for some older properties, particularly those replaced prior to 1951, have not been preserved. In these cases, it was necessary to estimate the dwelling's age and other characteristics from available assessment records, air photos, street directories, and comparison with

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<sup>8</sup>Civic censuses, which list the names of all the occupants living in a house, would have been an ideal source for determining multiple-occupancy, but unfortunately those censuses taken prior to 1961 have not been preserved.





adjoining properties. This problem was particularly acute in those older residential areas which now comprise the central business district. As a result, the present central area has been eliminated from all analyses.<sup>9</sup>

## DATA AGGREGATION AND UNITS OF OBSERVATION

Most information has been recorded at the property or site level and, when required, summarized at various levels of spatial aggregation. These aggregated units include, amongst others, redevelopment areas, concentric zones and sectors. Retention of data at the site level allows maximum flexibility and manipulation. For example, within a redevelopment area it is possible to obtain cross-tabulations of residential properties by selected housing characteristics, thus revealing significant differences or similarities among residential types.

Census enumeration areas are the principal units of observation for several analyses, forming the spatial framework for measuring areal correlates of conversion and redevelopment, as well as for tracing the evolution of the transition pattern. For this reason their advantages and limitations should be pointed out.

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<sup>9</sup>The excluded area coincides with the boundaries of census enumeration areas; eight areas were dropped. These were the only enumeration areas excluded in the study (see Figure 2).



Enumeration areas are considered by census officials to comprise the area and population which one enumerator can adequately cover when administering census materials. In this respect, they are essentially utilitarian devices and not the reflection of any concern with principles of urban structure.<sup>10</sup> In Edmonton, enumeration areas typically contain between 500 and 800 people and cover from five to seven city blocks. Like a larger census tract, their boundaries generally follow natural and man-made features. However, delimitation techniques are often criticized as showing little regard for the homogeneity of either the housing or the population which they enclose. In the 1951 built-up area there are several clear examples of this disregard, but field checking also revealed that most boundaries encompass fairly homogeneous areas. In addition, social data reported at the enumeration area level are subject to response and enumeration biases.<sup>11</sup> Further, the smaller size of

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<sup>10</sup> Discussions about the problems of using census areas and census data are contained in: D. L. Foley, "Census Tracts and Urban Research," Journal of the American Statistical Association, vol. 48, 1953, pp. 733-742; J. H. Marby, "Census Tract Variation in Urban Research," American Sociological Review, vol. 23, 1958, pp. 193-196; J. K. Myers, "Note on the Homogeneity of Census Tracts," Social Forces, vol. 32, 1954, pp. 364-366; and C. F. Schmid, "The Theory and Practice of Planning Census Tracts," Sociology and Social Research, vol. 22, 1938, pp. 228-238.

<sup>11</sup> Dominion Bureau of Statistics, The Nature and Extent of Variance Associated with EA Census Statistics, Ottawa, 1961, 2 pp.



these units will influence the correlation analyses done for this study; this is the so-called modifiable unit problem.<sup>12</sup> If larger units had been used, the results might have been considerably different, as the effect of using the smaller sized enumeration areas is to reduce the strength of the correlation coefficients. However, the decision to use enumeration areas rested largely on their ability to reveal spatial patterns in greater detail and with more precision: "the finer areal mesh which the enumeration district offers gives it a flexibility and utility which overrides the advantages...of the census tract."<sup>13</sup>

## LAND USE CLASSIFICATION

Because examination of the changing land use structure of transition areas is a primary research focus, development of a land use classification which accounted for both conversion and redevelopment processes was an important aspect of the research

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<sup>12</sup>For a discussion of this problem see: C. E. Gehlke and K. Biehl, "Certain Effects of Grouping Upon the Size of the Correlation Coefficient in Census Tract Material," Journal of the American Statistical Association, vol. 29, 1934, pp. 169-170; A. H. Robinson, "The Necessity of Weighting Values in Correlation Analysis of Areal Data," Annals, Association of American Geographers, vol. 46, 1956, pp. 233-236; and E. N. Thomas and D. L. Anderson, "Additional Comments on Weighting Values in Correlation Analysis of Areal Data," Annals, Association of American Geographers, vol. 55, 1965, pp. 492-505.

<sup>13</sup>B. T. Robson, Urban Analysis, Cambridge, University of Cambridge Press, 1969, p. 45.





design. Of necessity, this classification is based upon assessment data. The Assessor's Department recognizes several residential types, including buildings constructed as single-family houses, duplexes, rooming houses, row and terrace housing, and walk-up and high rise apartments. Duplexes are defined here as buildings containing from two to five dwelling units. Walk-up apartments have more than five dwelling units but are less than five storeys in height, whereas high rise apartments are five or more storeys in height.

Each residential type was assigned a converted counterpart. For example, if a duplex was subdivided to higher-density use, it was called a duplex conversion. Converted single-family houses, however, have been grouped as two-family conversions with either a basement or upstairs suite in addition to their single dwelling unit, or as multiple-family conversions with three or more dwelling units. In several cases, both duplex and single-family dwellings have been completely restructured to resemble newly built apartments, and have been included with walk-up apartment conversions. When a residence was redeveloped, the new use was classified according to the Assessor's Department's basic types, with the added notation that this new residence was built on a redeveloped site. The residential classification which was used is listed in Table 2.



TABLE 2

## RESIDENTIAL LAND USE CLASSIFICATION

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ORIGINAL USE

Single-family residences  
Duplexes  
Rooming houses  
Row and terrace housing  
Walk-up apartments  
High rise apartments

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CONVERTED USE

Two-family basement conversions (from single-family)  
Two-family upper-storey conversions (from single-family)  
Multiple-family conversions (from single-family)  
Duplex conversions  
Rooming house conversions  
Row and terrace housing conversions  
Walk-up apartment conversions (from single-family,  
duplex or apartment)  
High rise apartment conversions

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REDEVELOPED USE

Single-family residences (built on redeveloped site)  
Duplexes (built on redeveloped site)  
Rooming houses (built on redeveloped site)  
Row and terrace housing (built on redeveloped site)  
Walk-up apartments (built on redeveloped site)  
High rise apartments (built on redeveloped site)

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## MEASUREMENT OF TRANSITION PROCESSES

Methods of measuring conversion and redevelopment processes are more appropriately explained when the spatial and



sequential development of the transition pattern is analyzed. Similarly, preparation and choice of the variables which were used to measure areal correlates of conversion and redevelopment are discussed when these particular analyses are reviewed.

## FIELD RESEARCH

Informal interviews were conducted with city officials, homeowners and apartment developers during the course of the research. The intent was to clarify city development policies, to gain insights about why people converted their homes, or to find out why developers sought particular apartment locations. In addition, the housing and land use patterns of each enumeration area were checked both before and after assessment data were collected from the Assessor's Department. This procedure was done to ensure data accuracy and to gain direct information about the character of the study areas.



## Chapter II

### DIMENSIONS OF LAND USE AND PHYSICAL CHANGE IN THE 1951 BUILT-UP AREA

Recent economic and population growth has been a strong stimulus for transforming the patterns and forms of western Canadian cities.<sup>1</sup> Of the many changes, residential conversion and redevelopment activities have affected a larger area than any other process, and in Edmonton they have created a distinctive transition pattern. Walk-up and high rise apartments predominate in central locations and converted dwellings characterize many older neighbourhoods. Before the spatial and sequential development of this pattern is examined, however, the dimensions of land use and physical change which have emerged between 1921 and 1971 are outlined. Major trends are identified and the morphology of the study area is described to place the subsequent analyses in a clearer perspective.

#### CONCENTRATION OF CHANGE IN THE 1951 BUILT-UP AREA

From Table 3 it is evident that conversion and redevelopment are concentrated in those districts which were settled

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<sup>1</sup>P. J. Smith, "Changing Forms and Patterns in the Cities," in idem, ed., The Prairie Provinces, Studies in Canadian Geography, published for the 22nd International Geographical Congress, Toronto, University of Toronto Press (in press).





TABLE 3

LAND USE STRUCTURE OF THE CITY OF EDMONTON  
AND THE 1951 BUILT-UP AREA IN 1971  
(BY NUMBER OF HOUSES AND DWELLING UNITS<sup>1</sup>)

Land Use Types	1951 Area	City	Percentage in the 1951 Area
Single-family residences	25,225	71,173	35.4
Built on vacant land	24,944	70,594	33.3
Built on redeveloped site	281	579	48.5
Basement conversions	2,316	3,068	75.5
Upper-storey conversions	742	750	98.9
Multiple-family conversions	1,205	1,221	98.7
Duplexes	2,053	4,370	46.9
Built on vacant land	1,602	3,773	42.5
Built on redeveloped site	453	597	75.5
Duplex conversions	11	11	100.0
Rooming houses	44	44	100.0
Row and terrace housing	227	5,390	4.2
Walk-up apartment conversions	173	173	100.0
Walk-up apartments	16,501	24,047	68.2
Built on vacant land	3,132	9,499	32.8
Built on redeveloped site	13,369	14,548	91.7
High rise apartments	9,505	11,163	85.2
Built on vacant land	278	1,936	14.5
Built on redeveloped site	9,227	9,227	100.0

<sup>1</sup>Single-family, duplex, rooming and converted dwellings are measured by number of houses; row and terrace housing and apartments are measured by number of dwelling units.

Source: Assessor's Department, City of Edmonton, 1970-71.

by 1951. Almost all of the upper-storey and multiple-family conversions and three-quarters of the basement suites are located here.



Converted duplexes and houses which have been altered substantially to apartments, although few in number, are found only within this part of the city. The 1951 area also has captured all the high rise and more than 90 percent of the walk-up redevelopment activity. Moreover, despite a recent suburbanization trend, 70 percent of Edmonton's apartment units remain within this central area. Single-family redevelopment is the only transition process not concentrated here; it is evenly distributed throughout newer as well as older areas.

## PHYSICAL EXPANSION AND EVOLVING MORPHOLOGY<sup>2</sup>

What is the character of the 1951 built-up area and how has it evolved? Essentially, the rudiments of the present urban form were established by 1921, when it could be claimed that "... residential segregation based on economic factors was apparent."<sup>3</sup> Better-quality housing, characterized by large, two and three storey dwellings, extended south and west from the central business area, pre-empting the best sites along the crest of the river valley. When

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<sup>2</sup>Unless otherwise noted, the conclusions of this section are based on the city directories and assessment records contained in the Assessor's Department and the Archives of the City of Edmonton.

<sup>3</sup>O. D. Jones, "The Historical Geography of Edmonton, Alberta," unpublished M.A. thesis, University of Toronto, 1962, p. 58.



the original occupants of this district began to move away in the 1920s and 1930s, the homes they left succumbed to conversion. Because of their high maintenance costs, their eventual transition to rooming houses and apartments represented a more economical use. The area's quality was maintained, however, because the new tenants, instead of being unskilled immigrants, were professional and clerical workers employed in nearby government and business offices.

But the majority of housing in 1921 belonged to the middle and lower-income groups. Their districts spread northwest, north and northeast from the central business district, following established street-car routes and forming a distinctive U-shaped pattern around the Hudson's Bay Reserve (Figure 3).<sup>4</sup> Most of these neighbourhoods, as well as those which had sprung up in Strathcona, centred around the business node and the campus of the University of Alberta, contained a mixture of housing grades and styles. Houses were typically of frame construction, but their sizes, shapes and embellishments varied (Table 4). This variety was the result of

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<sup>4</sup>The Hudson's Bay Reserve, which was held vacant until the late 1940s, lies immediately south of the present site of the Industrial Airport. It had been deeded to the Hudson's Bay Company by the Canadian government. See J. G. MacGregor, Edmonton: A History, Edmonton, M. G. Hurtig, 1967, p. 194.





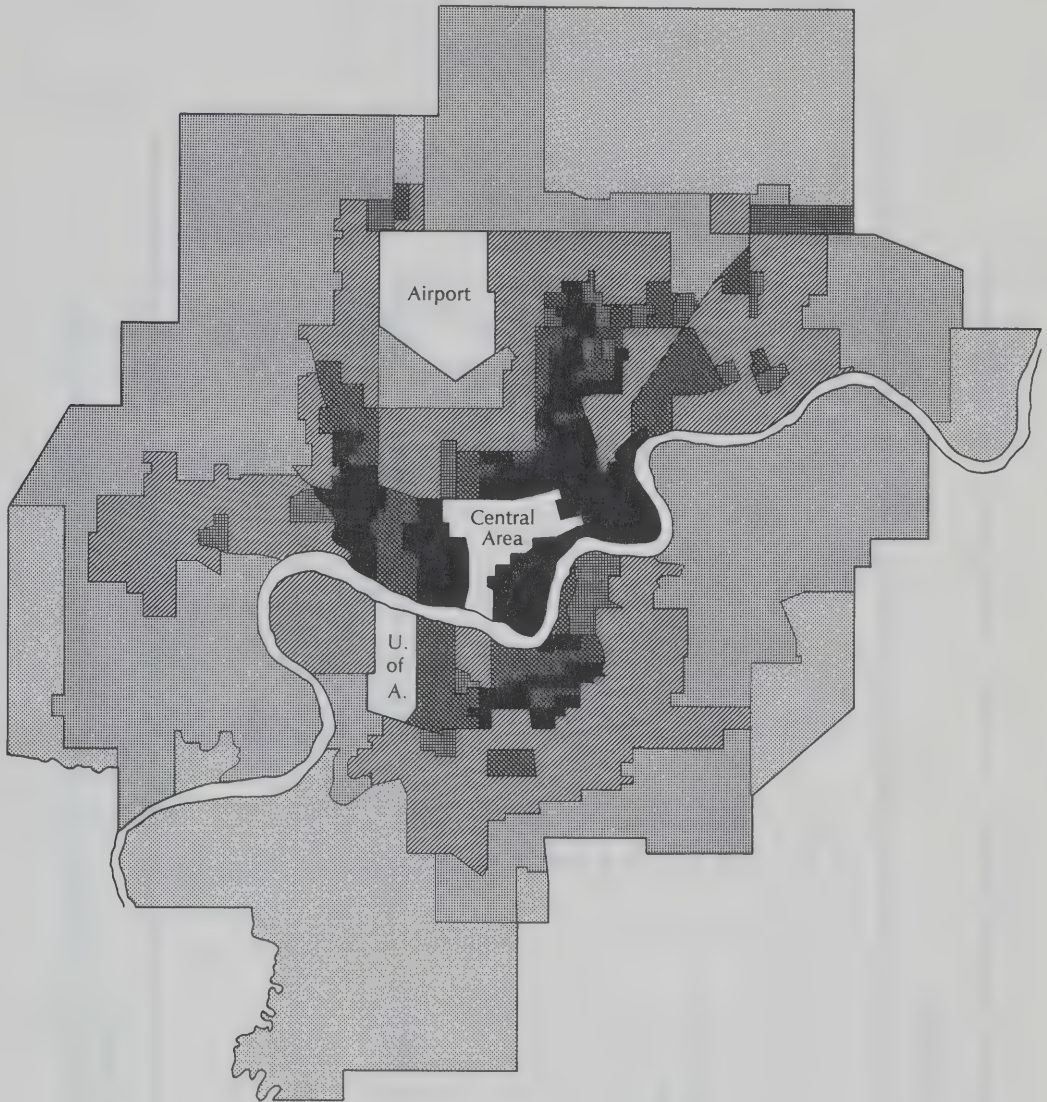
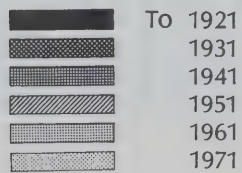


Figure 3  
PHYSICAL EXPANSION OF EDMONTON

Date Area Developed



0 0.5 1 Mile

Source: Assessor's Department,  
City of Edmonton,  
1970-71



TABLE 4

SELECTED CHARACTERISTICS OF THE MORPHOLOGY OF THE 1951 BUILT-UP AREA<sup>1</sup>  
(BY PERIOD OF CONSTRUCTION)

Characteristics	Prior to 1920	1920 to 1929	1930 to 1939	1940 to 1949	After 1949	Average of all Periods
Average parcel size	5,098.0	5,394.0	5,808.0	6,092.0	6,328.0	5,826.0
Average parcel frontage	40.0	41.0	37.0	45.0	48.0	44.0
Average ground floor area of houses	800.0	848.0	804.0	806.0	988.0	853.0
Average number of rooms	6.9	6.1	5.8	5.9	6.8	6.4
Single-family occupancy	98.5	99.0	98.7	96.3	85.0	94.5
Duplex occupancy	1.5	1.0	1.3	3.7	15.0	5.5
Frame construction	94.4	94.2	97.4	99.0	99.4	97.2
Brick construction	5.1	5.3	2.2	.9	.5	2.3
Cottages	24.9	32.5	47.3	37.0	9.7	27.7
Bungalows	5.6	28.1	24.1	36.7	67.3	35.2
One-and-a-half storey houses	13.9	21.7	16.4	22.3	18.1	18.9
One-and-three-quarter storey houses	19.5	4.5	2.2	.1	-	5.2
Two storey houses	30.5	11.3	8.0	2.0	2.2	10.1
Three storey houses	3.8	.4	-	-	-	.9
Good quality construction	9.4	16.7	17.0	19.7	30.9	19.7
Fair quality construction	62.8	58.6	59.3	60.1	61.2	60.8
Poor quality construction	27.5	24.8	23.7	20.2	7.9	19.5

<sup>1</sup>Data are expressed as percentages.

Source: Derived from 20 percent housing sample, Assessor's Department, City of Edmonton, 1970-71.



the large number of small-scale contractors who operated in the city at this time.

There was a common tendency for two storey dwellings to be concentrated near the central core and along the main transit routes, and for poorer grades of housing to be found in the northeast sector. The lower rents associated with this sector have attracted large concentrations of unskilled immigrants, particularly the Ukranian and Italian minorities.<sup>5</sup> Also, the inner part of this sector, which fringes the central business district, is now heavily converted. It is Edmonton's nearest approach to a slum and supports the highest population densities in the city, despite the absence of apartment buildings.

The residential pattern expanded very little between 1921 and 1941. Construction lagged in comparison to previous periods (Table 5), as the city's population grew slowly from 60,000 to just over 93,000. Mainly, the inter-war years were distinguished by intensification within an established network of grid-oriented

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<sup>5</sup>G. Kupfer, Edmonton Study: Community Opportunity Assessment, Edmonton, Government of Alberta, Department of Human Resources, 1967, 322 pp.; Z. S. Pohorecky and A. Royick, "Anglicization of Ukranians in Canada between 1895 and 1970," Canadian Ethnic Studies, vol. 1, 1969, pp. 141-219; and A. R. Powell, "Differentials in the Integration Process of Dutch and Italian Immigrants in Edmonton, Canada," International Migration, vol. 4, 1966, pp. 100-116.





TABLE 5

HOUSING STARTS IN THE CITY OF EDMONTON TO 1971  
(BY PERIOD OF CONSTRUCTION AND TYPE OF HOUSING<sup>1</sup>)

Construction Period	Detached Houses	Apartment Units
Prior to 1922	9,632	681
1922 - 1931	3,949	83
1932 - 1941	3,134	104
1942 - 1951	17,861	1,183
1952 - 1961	30,886	7,091
1962 - 1971	18,666	29,854

<sup>1</sup>Detached houses include single-family and duplex dwellings; apartment units include row and terrace housing as well as apartment units.

Source: Assessor's Department, City of Edmonton, 1970-71.

streets and subdivisions.<sup>6</sup> Houses were constructed on the serviced lots which had remained vacant since the land-boom period of 1908-1912. Still, the single-family wooden house was the mode, although smaller cottages and bungalows were now more common and the quality of housing had improved (Table 4).

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<sup>6</sup>Intensification was the specific land development policy of the City at this time. For further discussion see E. H. Dale, "The Role of Successive Town and City Councils in the Evolution of Edmonton, 1892-1966," unpublished Ph.D. dissertation, University of Alberta, 1969, pp. 110-115.





The 1940s brought renewed and vigorous building activity. Edmonton's economy prospered in response to the discovery and development of the nearby Leduc and Redwater oil fields, further consolidating the city's role as a service and transportation centre.<sup>7</sup> New housing pushed outwards in all directions, and tracts of similarly designed, stuccoed bungalows became the standard development form. Even for this period, though, a simple concentric growth model is inadequate to explain the residential expansion: "the typical pattern is for new building to be channelled into development corridors, along which it advances rapidly until further progress is barred by a major constraint... . Even in a period of rapid growth, some sections of the city remain virtually frozen."<sup>8</sup> During the forties, the only semblance of zonal growth was the extension to the south of the Strathcona business centre. The rest of the 1951 area is aligned to the major arterials which lead west towards Jasper Place, north towards the old railroad community of Calder, and east towards the Beverly district (Figure 3).

Since 1951 distinct development corridors have thrust into widely separated areas which are located parallel to the course

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<sup>7</sup>W. C. Wonders, "Edmonton, Alberta: Some Aspects of Its Urban Geography," The Canadian Geographer, no. 9, 1957, pp. 7-20.

<sup>8</sup>Smith, op. cit., n. p.



of the river. Better-quality districts continue to pre-empt the prime river sites, particularly in the southwest sector, causing other areas to be graded and sorted away from this axial trend. But in contrast to previous periods when the single-family house was the norm, apartment construction has now assumed greater importance (Table 5), and much of this building has been on redeveloped sites. Twenty years of rapid growth, during which Edmonton's population has surged to the half-million mark, have put great pressure on the mature residential areas--all the more since these districts tend to be within close proximity to the principal business and institutional nuclei. The forces which spur residential change are thus affecting the whole of the 1951 built-up area, and because current zoning law permits conversion and redevelopment over the greater part of this area, the land use pattern is being substantially restructured.

## CHANGING RESIDENTIAL LAND USE STRUCTURE

To identify and measure these changes, land use proportions have been reconstructed at ten-year intervals from 1921. Table 6 shows the total land use structure, including vacant land, while Table 7 displays only the developed land area. Certain land uses, such as apartments, have been grouped by type of development



TABLE 6

CHANGES IN THE RESIDENTIAL LAND USE STRUCTURE OF THE 1951 BUILT-UP AREA, 1921-1971  
(BY PERCENTAGE OF TOTAL LAND AREA AND NUMBER OF PROPERTIES)

Land Use Types	1921	1931	1941	1951	1961	1971		
Single-family residences	22.9	9,084	32.4	12,643	37.8	14,487	74.4	25,225
Built on vacant land	22.9	9,084	32.4	12,643	37.8	14,487	73.6	24,944
Built on redeveloped site	-	-	-	-	-	-	.8	281
Basement conversions	-	-	-	-	12	12	77.8	27,079
Upper-storey conversions	-	3	-	18	.4	179	7.6	2,717
Multiple-family conversions	-	4	.1	38	.9	357	2.3	917
Duplexes	.2	76	.3	111	.4	143	3.2	1,337
Built on vacant land	.2	76	.3	111	.4	143	5.1	1,867
Built on redeveloped site	-	-	-	-	-	-	4.8	1,737
Duplex conversions	-	-	-	-	-	2	.3	130
Rooming houses	.1	40	.1	47	.1	47	-	10
Row and terrace housing	-	4	-	7	.3	9	.1	53
Walk-up apartment conversions	-	-	-	-	-	-	.4	10
Walk-up apartments	.2	41	.3	47	.3	59	-	10
Built on vacant land	.2	41	.3	47	.3	59	1.8	363
Built on redeveloped site	-	-	-	-	-	-	1.5	250
High rise apartments	-	-	-	-	-	-	.4	113
Built on vacant land	-	-	-	-	-	-	.1	7
Built on redeveloped site	-	-	-	-	-	-	-	-
Vacant land	76.6	-	66.7	-	60.1	-	.1	7
							1.4	.1
Total land area <sup>1</sup>	206,501	206,501	206,511	206,325	204,706	199,902		

<sup>1</sup> Land area is in thousands of square feet.

Source: Assessor's Department, City of Edmonton, 1970-71.





TABLE 7

CHANGES IN THE RESIDENTIAL LAND USE STRUCTURE OF THE 1951 BUILT-UP AREA, 1921-1971  
(BY PERCENTAGE OF TOTAL DEVELOPED LAND AREA AND NUMBER OF PROPERTIES)

Land Use Types	1921	1931	1941	1951	1961	1971
Single-family residences	97.5	97.4	94.5	89.9	78.9	74.5
Built on vacant land	9,084	12,643	14,487	27,799	27,079	25,225
Built on redeveloped site	97.5	97.4	94.5	89.9	78.7	73.7
Basement conversions	-	-	-	-	.3	.9
Upper-storey conversions	-	3	1.1	1.4	7.7	6.6
Multiple-family conversions	-	4	2.2	1.7	2.3	1.8
Duplexes	.8	76	.9	2.4	3.3	2.9
Built on vacant land	76	111	143	1,001	1,867	1,205
Built on redeveloped site	.8	76	.9	3.1	5.2	5.8
Duplex conversions	-	-	-	3.1	4.9	4.3
Rooming houses	.4	40	.3	-	.3	1.5
Row and terrace housing	.1	4	.1	-	10	11
Walk-up apartment conversions	-	-	-	-	10	-
Walk-up apartments	1.0	41	.8	1.0	363	1,067
Built on vacant land	1.0	41	.8	1.0	250	277
Built on redeveloped site	-	-	-	-	113	790
High rise apartments	-	-	-	-	.1	1.3
Built on vacant land	-	-	-	-	-	.1
Built on redeveloped site	-	-	-	-	.1	1.2
Total developed land area <sup>1</sup>	48,396	68,680	82,802	179,102	201,751	199,694

<sup>1</sup> Land area is in thousands of square feet.

Source: Assessor's Department, City of Edmonton, 1970-71.



site (vacant or redeveloped), allowing a more accurate evaluation of the role of redevelopment.<sup>9</sup>

From the tables it is clear that single-family residences still dominate the residential land use pattern, although they have experienced a gradual decline in land area from 98 to 75 percent between 1921 and 1971 (Table 7). The largest drop, from 90 to 79 percent, occurred during the 1950s, which coincides with the marked increase of basement, upper-storey and multiple-family conversions. These transition uses more than doubled, as their combined land area jumped from 5 to 13 percent and their numbers rose from less than 2,000 to just over 5,000. Prior to 1951, houses with upper and multiple suites had shown small but consistent gains, but the appearance of basement conversions was featured by a considerable flurry of activity. Their share of the developed land area increased from 1 percent in 1951 to 8 percent in 1961.

After this date, single-family residences continued to decline and, significantly, each conversion type reversed its upward

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<sup>9</sup>The amount of vacant land existing at a particular date was determined by subtracting the developed land area at this date from the total land area developed by residential uses to 1971 (plus vacant land zoned for residential purposes which existed in 1971). The vacant totals which were calculated are not entirely precise. For example, vacant land which might have been zoned for residential use in 1941, and which since may have been developed by a non-residential use, was not taken into consideration.



trend. For example, between 1961 and 1971 the number of basement suites fell from 2,717 to 2,316. These losses are associated with the upsurge in apartment construction which previously had been almost negligible. More than 750 apartment buildings containing over 22,000 suites were built on redeveloped sites during the sixties. Thus, although apartments comprised less than 10 percent of the property area in 1971, they now constitute over half of the study area's dwelling units.

Throughout the study period (1921-1971), transition land uses have comprised only a small proportion of the residential structure (less than 25 percent). Nevertheless, residential change appears to fall into a simple three-stage sequence in which transition processes play an important role. Single-family development dominates the first phase, but as the supply of vacant land diminishes, dwelling conversion commences. Relatively few houses are converted when this stage is supplanted by redevelopment activity. The validity and nature of this sequence will be explored in greater depth in a later chapter.

## COMPOSITION AND MAGNITUDE OF PHYSICAL CHANGE

Conversion and redevelopment processes involve physical or structural change as well as functional change. By



subdividing a house to higher-density use through the addition of one or more dwelling units, or by replacing it with another residential building, either conversion or redevelopment occurs. The number of houses converted to new uses is shown in Table 8. From 1922 to 1931, for example, there were 12,810 houses which could have been converted, but only 49 or .3 percent were so affected. These results add a further dimension to the interpretation of residential change.

The periods prior to 1951 were quiet, showing conversion rates not greater than 4.4 percent. The dominant forms of structural change were upper-storey and multiple-family conversion. During the 1950s, by contrast, nearly 10 percent of the housing stock was converted, mainly to basement suites (6.7 percent). However, this rate did fall back to less than 3 percent between 1962 and 1971. Despite the small increments in each period, overall more than 6,000 or about 17 percent of the houses built in the 1951 area have been converted. The fact that the land use proportion for converted dwellings never reached this amount implies that some conversions have reverted to single-family status, or that conversions have been redeveloped at a greater rate than single-family dwellings. These possibilities are more appropriately examined when the transition sequence is analyzed.





TABLE 8

THE RESIDENTIAL CONVERSION PROCESS IN THE 1951 BUILT-UP AREA, 1922-1971  
(NUMBER OF HOUSES CONVERTED TO A HIGHER DENSITY USE AS A PERCENTAGE  
OF THE TOTAL HOUSES IN THE STUDY AREA)

Type of Conversion	1922 to 1931	1932 to 1941	1942 to 1951	1952 to 1961	1962 to 1971	1922 to 1971						
Basement conversions	-	-	12	-	431	1.4	2,311	6.7	514	1.5	3,278	9.4
Upper-storey conversions	15	.1	161	1.3	424	1.4	444	1.3	149	.4	1,193	3.4
Multiple-family conversions	34	.2	319	2.5	504	1.6	505	1.5	167	.5	1,529	4.3
Duplex conversions	-	-	2	-	1	-	7	-	3	-	13	.1
All types of conversions	49	.3	494	3.9	1,363	4.4	3,274	9.5	834	2.4	6,024	17.1
Total houses	12,810	15,180	30,747	34,605	34,837	35,549						

Source: Assessor's Department, City of Edmonton, 1970-71.



TABLE 9

THE RESIDENTIAL REDEVELOPMENT PROCESS  
IN THE 1951 BUILT-UP AREA, 1952-1971  
(NUMBER OF HOUSES REDEVELOPED TO A NEW RESIDENTIAL  
USE AS A PERCENTAGE OF THE TOTAL HOUSES IN THE  
STUDY AREA)

Type of Redevelopment	1952 to 1961		1962 to 1971		1952 to 1971	
Single-family residences	91	.3	190	.6	281	.8
Duplexes	132	.4	321	.9	453	1.3
Walk-up apartments	112	.4	1,477	4.4	1,589	4.6
High rise apartments	12	-	384	1.1	396	1.1
All types	347	1.1	2,372	7.0	2,719	7.8
Total houses	30,704		33,937		34,648	

Source: Assessor's Department, City of Edmonton, 1970-71.

The decline in conversion can be related primarily to the sharp rise in redevelopment during the 1960s when 7 percent of the housing stock was replaced (Table 9). Previous redevelopment was minimal, and was characterized by single-family and duplex construction. Apartments gained the principal role after 1961, as nearly 2,000 houses yielded to walk-up and high rise apartments. The importance of apartment construction is further illustrated in Table 10. Apartments are clearly the most intensive form of



TABLE 10  
SUMMARY OF RESIDENTIAL REDEVELOPMENT IN THE 1951 BUILT-UP AREA, 1952-1971  
(BY NUMBER OF PROPERTIES AND DWELLING UNITS ADDED BY REDEVELOPMENT TYPES)

Type of Redevelopment	1952-1961			1962-1971			1952-1971		
	Properties No.	%	Dwelling Units No.	Properties No.	%	Dwelling Units No.	Properties No.	%	Dwelling Units No.
Single-family residences	91	26.8	91	190	14.9	190	281	17.4	281
Duplexes	132	38.8	396	321	25.3	963	453	28.3	1,359
Walk-up apartments	110	32.4	1,247	677	53.4	12,093	787	48.9	13,340
High rise apartments	7	2.0	379	81	6.4	8,848	88	5.4	9,227
Totals	340	100.0	2,113	1,269	100.0	22,094	1,609	100.0	24,207

Source: Assessor's Department, City of Edmonton, 1970-71.





redevelopment. Since 1951 they have contributed more than 90 percent of the dwelling units but less than 55 percent of the properties.

## SUMMARY

The diverse morphology of the 1951 built-up area can best be summarized by examining the residential pattern from the central business district outwards. The older areas close to the central core and near Strathcona, which were formed during the land-boom period ca. 1910, consist of a dense development of two storey dwellings, interspersed by smaller house types. In the few high status neighbourhoods which follow the river valley to the west of the central business area, there is a rich variety of well-constructed homes. Just to the east of the core, housing is of poorer quality and has attracted lower-income groups. Beyond these districts there is a very mixed building pattern which has evolved over a span of 30 to 40 years and which covers most of the study area. In these areas, architectural styles and building qualities generally vary, although average grade construction and cottage or bungalow style is the common development form.

Redeveloped and converted land uses, although comprising less than 25 percent of the total developed area, are widespread. Figure 4 summarizes the land use and physical change



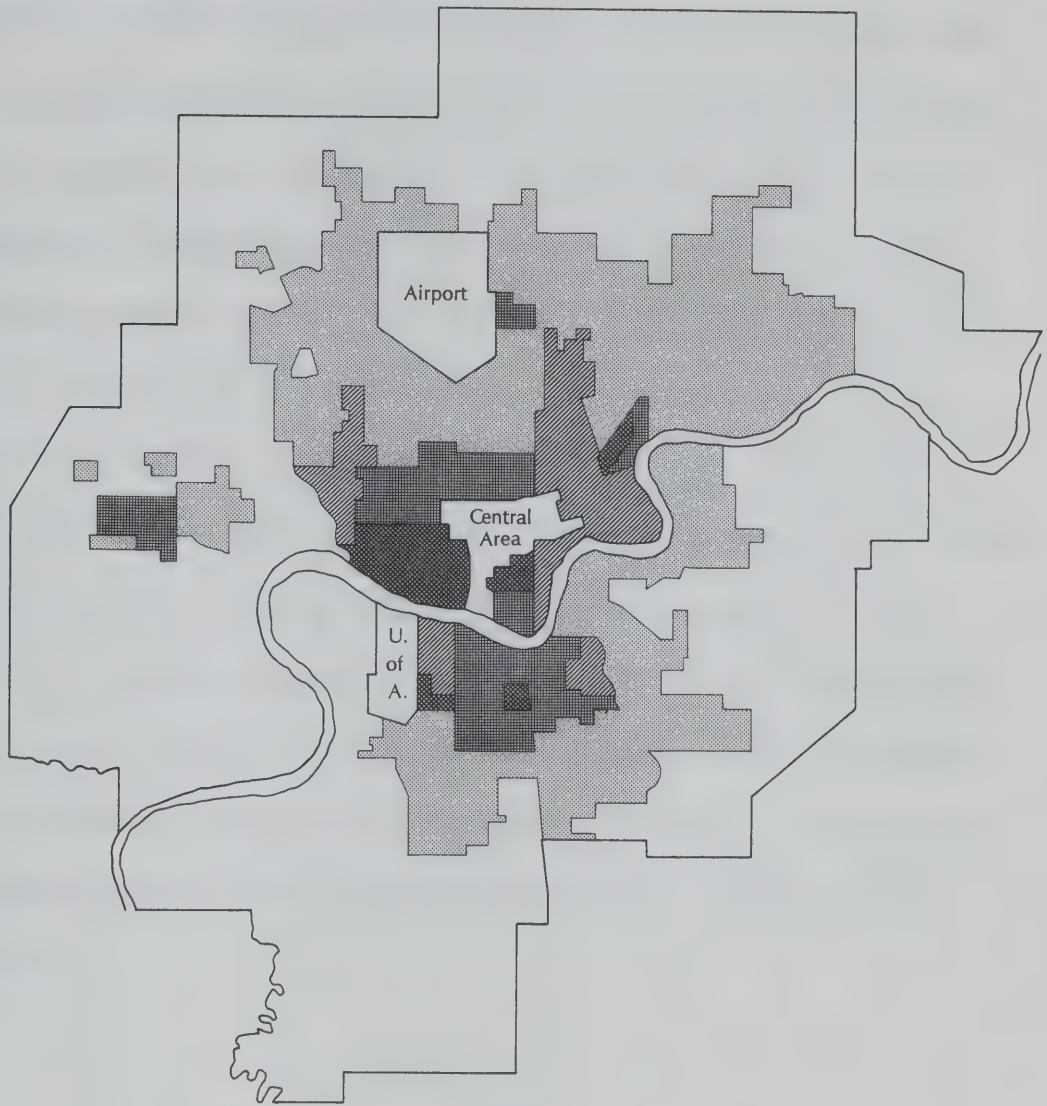




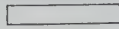



Figure 4  
TRANSITION PATTERN, 1971

Dominant Type of Land Use Change

-  High rise apartment redevelopment
-  Walk-up apartment redevelopment
-  Multiple-family and upper-storey conversion
-  Basement conversion
-  Areas with less than 5 per cent of houses converted or redeveloped
-  Limit of Built-Up Area

0      0.5      1 Mile



analyses. Enumeration areas in which more than 5 percent of the houses have been either converted or redeveloped are mapped by their dominant form of change. The 24,000 units added through apartment construction are mainly distributed near the central business district, within the Strathcona-University of Alberta district, and adjacent to several other development nodes. Upper-storey and multiple-family conversion processes, the earliest transition forms, favour locations in older neighbourhoods. Houses with converted basement suites, of which there are more than 2,500, are spread throughout newer districts of post-1940 housing. In all cases, containment within the 1951 built-up area is apparent. The remaining chapters of this thesis will therefore describe and explain the spatial and sequential development of this transition pattern.



## Chapter III

THE SPATIAL DEVELOPMENT OF RESIDENTIAL  
AREAS IN TRANSITION

Nearly fifteen years ago Ackerman stated that the "study of the evolution of space content...is the fundamental research frontier" in geography.<sup>1</sup> He further asserted that detailed examination of change processes was particularly necessary. Despite the importance of these comments and long-standing research interests in aspects of urban change, little is yet known about the spatial development of residential areas in transition. Only generalizations exist.

This chapter is thus concerned with the ways in which conversion and redevelopment processes have interacted through time and space to form a transition pattern. Based on available literature, a descriptive model of spatial development is outlined and then tested against the Edmonton data. Only the spatial movement and directional biases of the transition processes are described; factors explaining locational tendencies are examined in subsequent chapters.

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<sup>1</sup>E. A. Ackerman, Geography as a Fundamental Research Discipline, Research Paper No. 58, Department of Geography, University of Chicago, 1958, p. 28.





## A SPATIAL MODEL OF TRANSITION AREA DEVELOPMENT

The classical models of urban growth contain explicit but largely unsubstantiated references to spatial aspects of land use and physical change. However, the Burgess and Hoyt models do contain the premise that change begins near the central business district and, through time, will disperse outwards in a concentric manner.<sup>2</sup> Initiated by pressure from the expanding core, the mechanisms of spatial change are filtering and succession, and transition areas characterized by conversion activity will increase in size by encroaching upon the nearest and next oldest residential area. In this manner, single-family neighbourhoods are converted to higher-density use in a continuous outward progression from the city's centre. In the polynuclear Harris and Ullman model, conversion is also implied to expand concentrically, but from other nuclei besides the central core, with a probable coalescence with inner-city transition areas.<sup>3</sup>

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<sup>2</sup>E. W. Burgess, "The Growth of the City: An Introduction to a Research Project," in R. E. Park et al, The City, Chicago, University of Chicago Press, 1925, p. 49; and H. Hoyt, The Structure and Growth of Residential Neighbourhoods in American Cities, Washington, United States Government Printing Office, 1939, p. 81.

<sup>3</sup>C. D. Harris and E. L. Ullman, "The Nature of Cities," in H. M. Mayer and C. F. Kohn, eds., Readings in Urban Geography, Chicago, University of Chicago Press, 1959, p. 283.



There is some empirical support for this interpretation. Robson has compared the distribution of subdivided houses in Sunderland, England, in 1892 and 1963, and has concluded that the "general outward concentric invasion of the Burgess type" is evident.<sup>4</sup> Studies of spatio-temporal changes in urban population densities suggest that conversion might be an important factor which accounts for the outward movement of increasing densities.<sup>5</sup> Investigations by other authors lend further support.<sup>6</sup> However, their studies have treated the spatial aspects of conversion only incidently within the broader context of population redistribution. While observing that immigrant and other minority groups often locate first near the central business district and later disperse outwards, they have noted that conversion has accompanied these movements.

Residential redevelopment receives scant attention in the classical models. Only Hoyt observed that luxury apartments

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<sup>4</sup>B. T. Robson, Urban Analysis, Cambridge, University of Cambridge Press, 1969, p. 121.

<sup>5</sup>See in particular J. Mercer, "Density Decline Surfaces in Urban Areas," The Canadian Geographer, vol. 12, 1968, pp. 158-175.

<sup>6</sup>See for example O. D. Duncan and B. Duncan, The Negro Population of Chicago, Chicago, University of Chicago Press, 1957, pp. 87-107; and D. Ward, "The Emergence of Central Immigrant Ghettos in American Cities: 1840-1920," Annals, Association of American Geographers, vol. 58, 1968, pp. 343-359.



could replace older housing in a sector-shaped area near the central business district.<sup>7</sup> Recent empirical studies, in contrast, are far more explicit in their interpretation of the relationship between evolving residential structure and the spatial patterning of redevelopment activity.<sup>8</sup> However, they place little emphasis on movements through space or on types of redevelopment.

Ideally, if redevelopment (by either public or private means) is thought to occur solely as a function of age and obsolescence, it should surround the central core and, following the course of a city's development, in time disperse towards the periphery. Redevelopment is thus part of a continuum or cycle of spatial growth.<sup>9</sup> Empirical studies, however, point to the development of a dispersed pattern. While most redevelopment will likely occur near the central business district, especially in high-rent sectors as Hoyt hypothesized, it will also take place along major access routes and near large employment and institutional centres. This

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<sup>7</sup>Hoyt, op. cit., p. 118.

<sup>8</sup>See for example L. S. Bourne, "Market, Location and Site Selection in Apartment Construction," The Canadian Geographer, vol. 12, 1968, pp. 211-226; and H. Gayler, "Private Residential Redevelopment in the Inner City: The West End of Vancouver, Canada," Journal, Town Planning Institute, vol. 57, 1971, pp. 15-20.

<sup>9</sup>From this point on in the discussion, consideration is for private redevelopment only.





suggests, as Bourne notes, that redevelopment "...is not a spatially continuous phenomenon."<sup>10</sup>

Together, conversion and redevelopment will interact through time and space to form a transition pattern. Based on the limited literature available, and drawing together the previous discussions on the development of conversion and redevelopment patterns, the most likely situation is described. It will serve as a descriptive model against which the Edmonton data can be evaluated. Attention is focussed solely on the spatial expression of the transition processes. A major problem, however, is whether conversion or redevelopment will occur first in an area. There are no studies which specifically explore the spatial relationship between these two processes, but most evidence, especially that drawn from the economics literature,<sup>11</sup> suggests that conversion should precede redevelopment. The model will therefore include this assumption.

Thus, conversion initiates the spatial development of the transition pattern, beginning near the central core and possibly

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<sup>10</sup>L. S. Bourne, Private Redevelopment in the Central City, Research Paper No. 112, Department of Geography, University of Chicago, 1967, p. 41.

<sup>11</sup>See for example E. M. Fisher and R. M. Fisher, Urban Real Estate, New York, Henry Holt, 1954, pp. 338-341; and W. Lean and B. Goodall, Aspects of Land Economics, London, The Estates Gazette, 1966, pp. 193-210.



near other nuclei (Figure 5). As the city grows and ages, conversion will disperse concentrically outwards, enlarging the size of the transition area. At all times the highest density of converted properties will be found near the central area. When redevelopment is superimposed on this pattern, it is assumed that conversion and redevelopment will continue to take place simultaneously. This would result in the further expansion of existing conversion areas and the emergence of redevelopment areas near the development nodes. Redevelopment will most likely expand in sector or radial-like fashion, and in directions away from the zone of discard.<sup>12</sup>

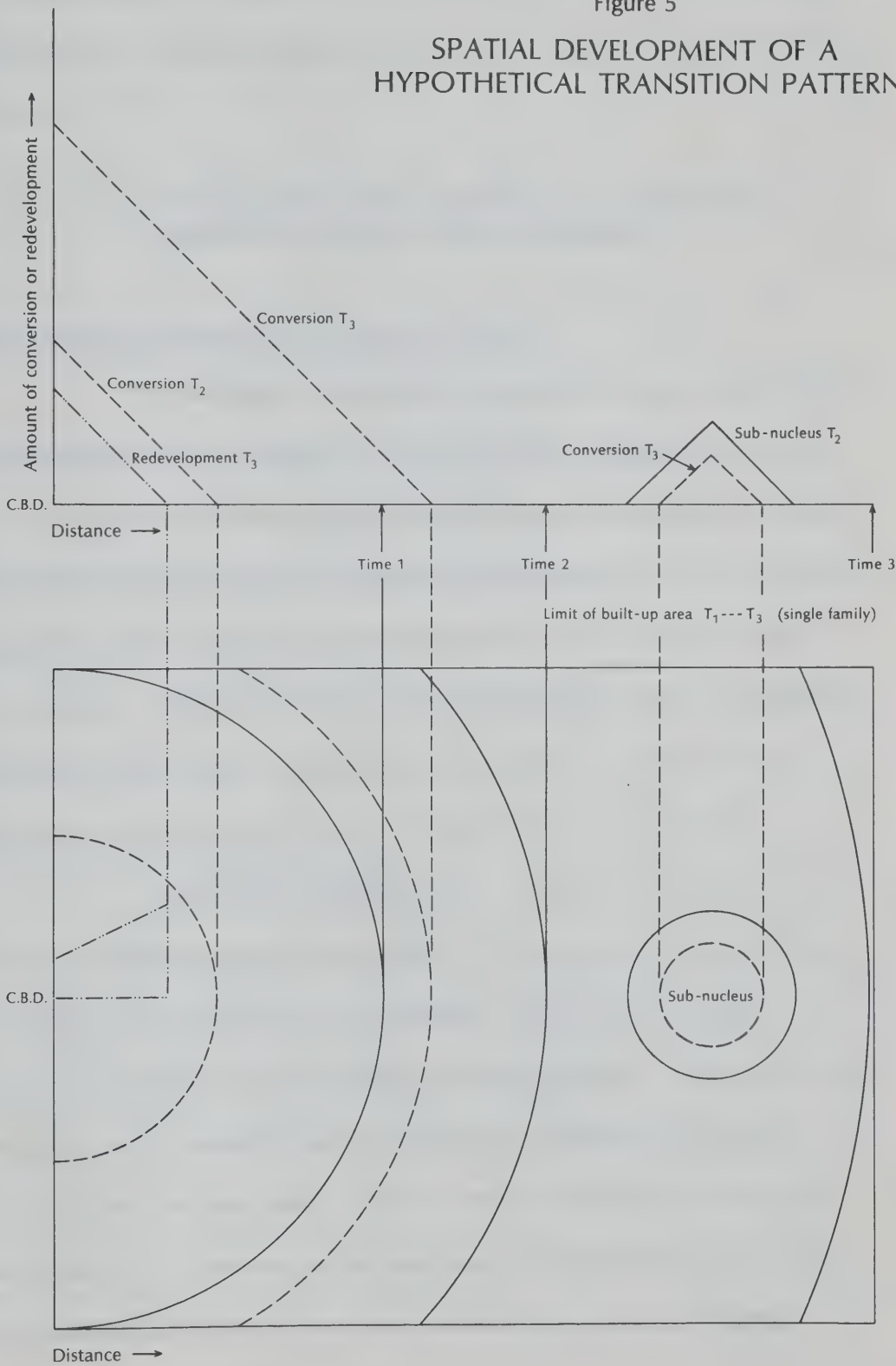
This model does not indicate where conversion or redevelopment will be concentrated in the city during a particular period, or if change can be arrested. Nor does it indicate if the transition pattern, during the course of its development, will be differentiated by distinct forms of conversion or redevelopment activity. Although largely ignored in the literature, these are important aspects, and they will be considered in the empirical evaluation of the model. The model will be tested against data for the entire city, not just the 1951 built-up area. This will show how

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<sup>12</sup>This directional bias has been observed in one Canadian city. See P. J. Smith, "Change in a Youthful City: The Case of Calgary, Alberta." Geography, vol. 56, 1971, p. 13.



Figure 5  
SPATIAL DEVELOPMENT OF A  
HYPOTHETICAL TRANSITION PATTERN





the transition pattern has evolved in relation to the spatial development of the city and how change has become concentrated within the 1951 area.

## SPATIAL PROCESSES AND CHANGING PATTERNS OF TRANSITION AREA DEVELOPMENT

### Measurement of Spatial Processes of Change

To measure the spatial aspects of change processes, two procedures were followed. One involved mapping the distribution of converted and redeveloped properties at ten-year intervals. Enumeration areas formed the spatial framework. In this way the areal extent of the transition pattern between 1921 and 1971 was clearly traced. However, this method told little about the dynamics of a process, about how a pattern was formed, or about where change was concentrated in the city between time intervals.

These shortcomings were overcome by employing a second but complementary procedure. This required calculating and mapping the percentage of dwellings which were actually converted or redeveloped during each ten-year period. This particular technique, made possible because data for individual properties were collected, is absolutely precise and is therefore preferable to the alternative of comparing the aggregate quantities of a land use type at two points in time and then calculating a rate of change.





To supplement the conversion maps, graphs were prepared as summary devices. These plot the results of the change analyses by ten half-mile zones from the city's centre. These were also prepared for the redevelopment analyses, but because redevelopment is reasoned to display a more dispersed pattern, a grid of eight sectors was superimposed on the zonal framework. The result is a more accurate depiction of the redevelopment pattern.

### Changing Patterns of the Dwelling Conversion Process

The development of the composite pattern, which includes basement, upper-storey, multiple-family, duplex and walk-up apartment conversions, is examined first. Then, individual types of conversion are treated to determine if they account for variations within the total pattern.

All Types of Converted Dwellings. Very few dwellings were converted in either 1921 or 1931 (Figures 6 and 7). As anticipated, most were concentrated in central locations, although others were dispersed throughout the northeast sector and around Strathcona. By 1941, though, a transition pattern was firmly established, and its areal extent coincided quite closely with the boundaries of the developed city (Figure 8). Areas adjoining the central business district possessed the highest proportions of converted dwellings;



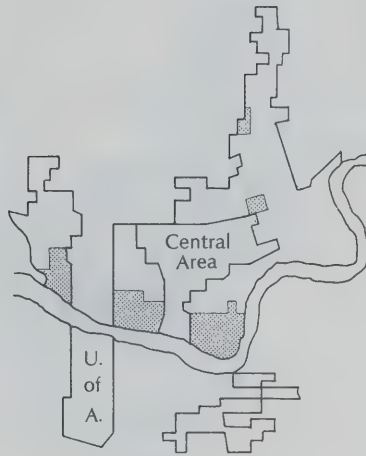
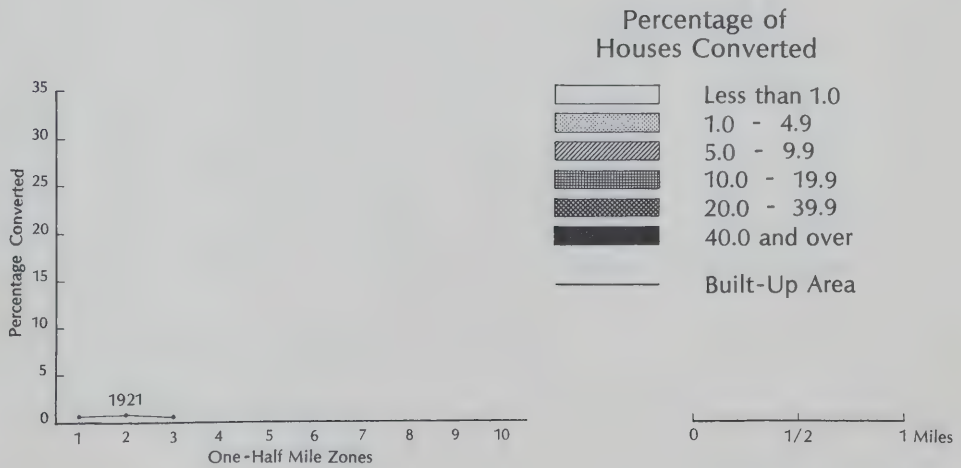


Figure 6  
DISTRIBUTION OF CONVERTED  
DWELLINGS, 1921  
(ALL TYPES)



Source: Assessor's Department,  
City of Edmonton,  
1970-71



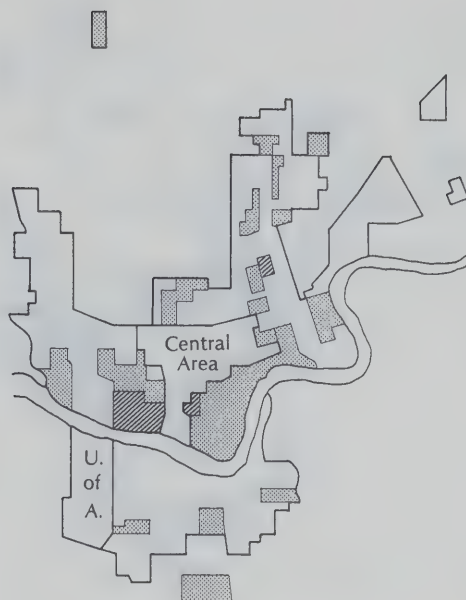
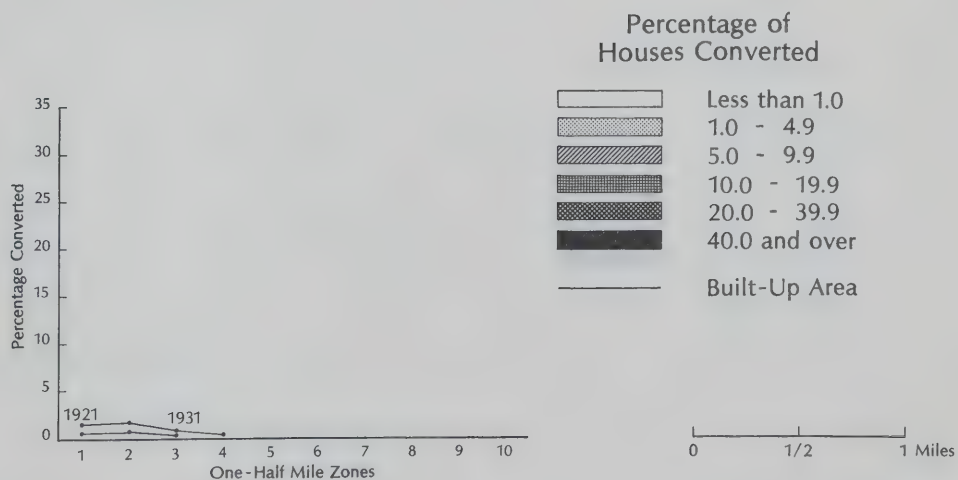


Figure 7  
DISTRIBUTION OF CONVERTED  
DWELLINGS, 1931  
(ALL TYPES)



Source: Assessor's Department,  
City of Edmonton,  
1970-71





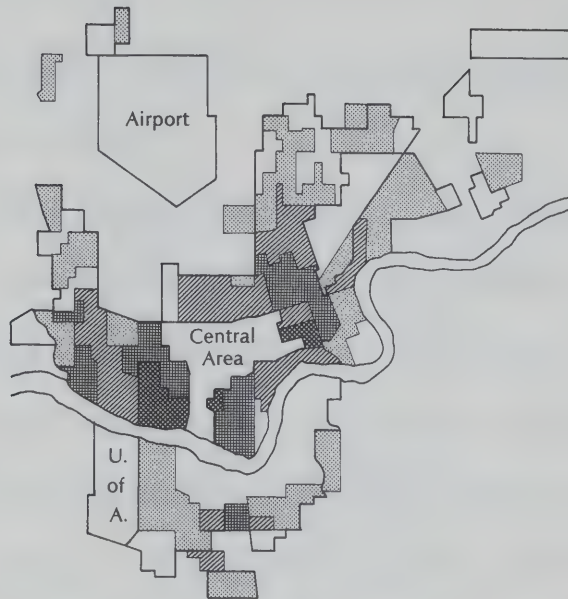
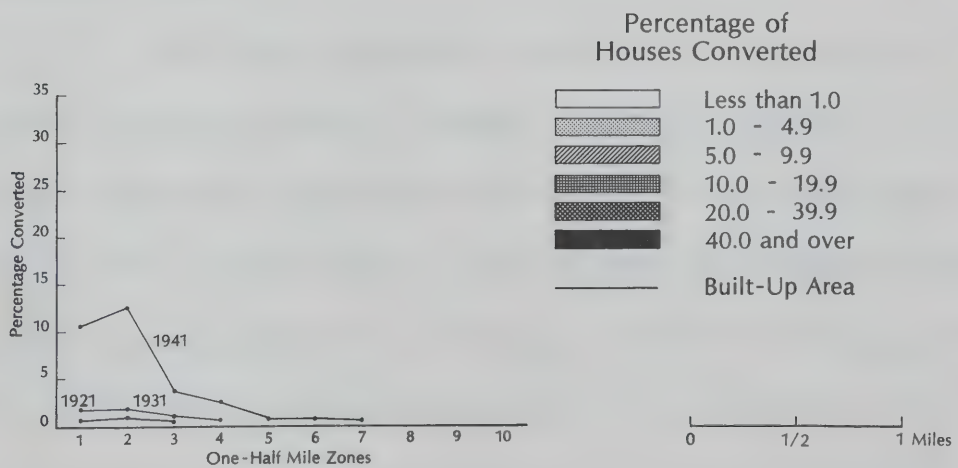


Figure 8  
DISTRIBUTION OF CONVERTED  
DWELLINGS, 1941  
(ALL TYPES)



Source: Assessor's Department,  
City of Edmonton,  
1970-71



these same areas, in fact, had experienced the highest rates of change between 1932 and 1941 (Figure 9). An exception was the pocket of housing which lay to the southeast in the river valley bottom. Here, many houses are small cottages and generally unsuitable for alteration to suites.

By 1951 the transition pattern had expanded considerably (Figure 10). Conversion remained conterminous with the built-up area except for its exclusion from the better-quality areas located along the river valley several miles west of the central business district and immediately west of the university. Expansion was in an orderly manner, moving from neighbourhood to neighbourhood, altering the residential pattern in a steady outward progression. Nevertheless, areas near the central core still retained the highest conversion rates and in several a rate of 20 percent or more was achieved (Figure 11).

The 1950s witnessed an extensive transformation of Edmonton's conversion pattern. Change continued unabated and the 1961 map is marked by significant intensification and lateral expansion (Figure 12). Indeed, only the most recently developed residential districts escaped the forces of change, as more than one-quarter of the nearly 600 enumeration areas experienced conversion rates of 10 percent or more. In nearly 100 areas, more than 20 percent of



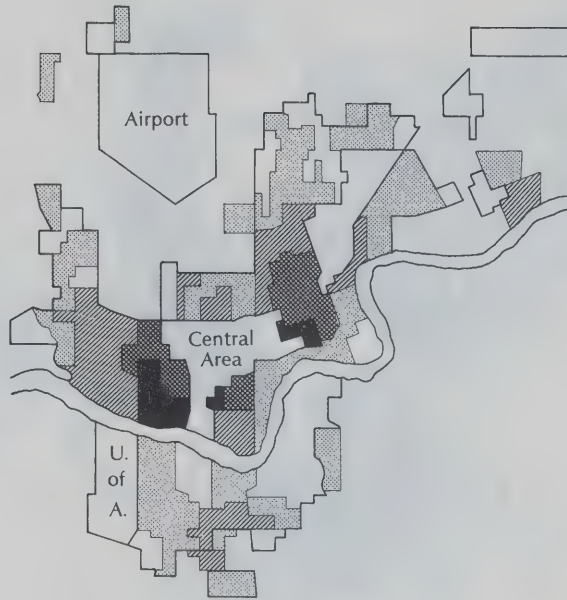
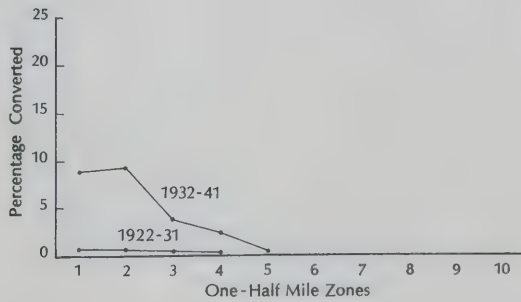
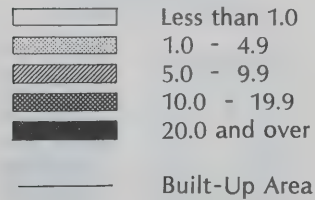


Figure 9  
LOCATION OF CONVERSION  
ACTIVITY, 1932-1941  
(ALL TYPES)

Percentage of  
Houses Converted



0 1/2 1 Miles

Source: Assessor's Department,  
City of Edmonton,  
1970-71



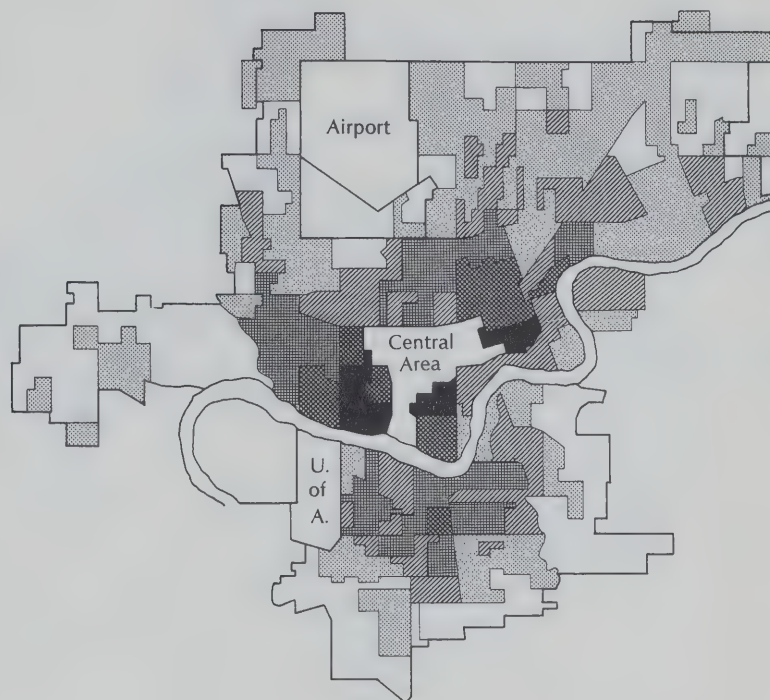
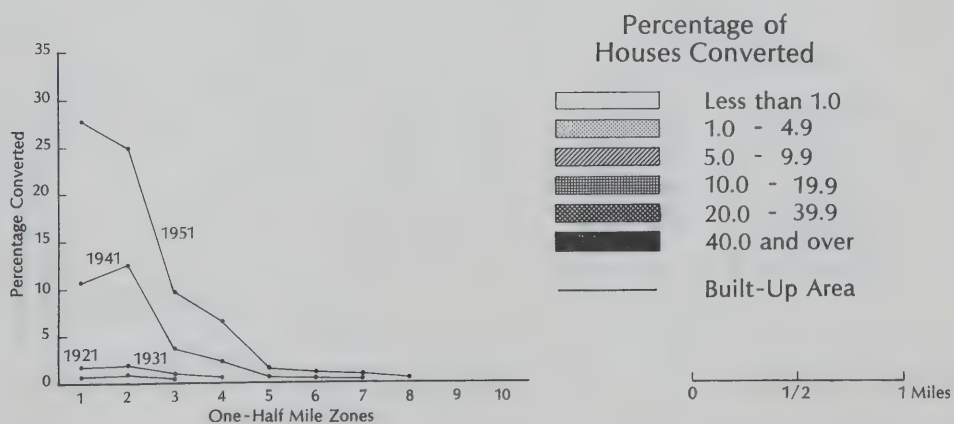


Figure 10  
DISTRIBUTION OF CONVERTED  
DWELLINGS, 1951  
(ALL TYPES)



Source: Assessor's Department,  
City of Edmonton,  
1970-71





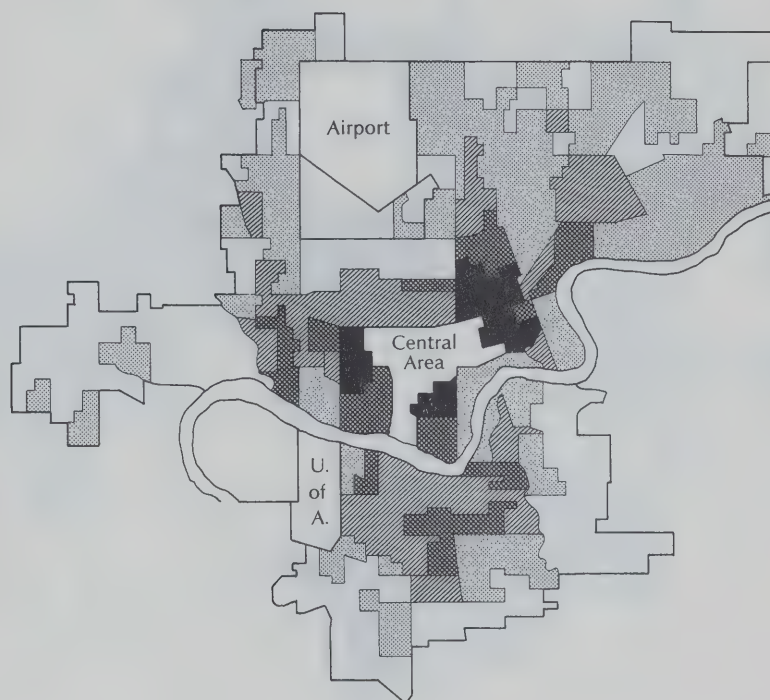
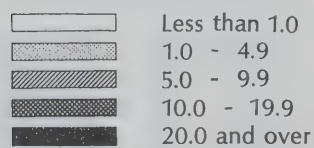


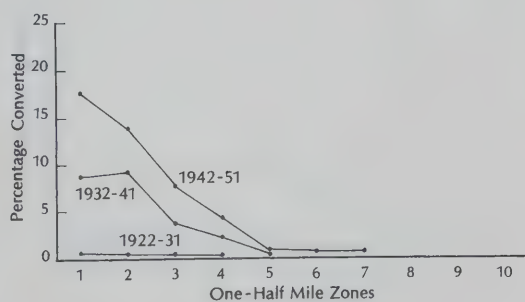
Figure 11

# LOCATION OF CONVERSION ACTIVITY, 1942-1951 (ALL TYPES)

Percentage of  
Houses Converted



— Built-Up Area



0 1/2 1 Miles

Source: Assessor's Department,  
City of Edmonton,  
1970-71



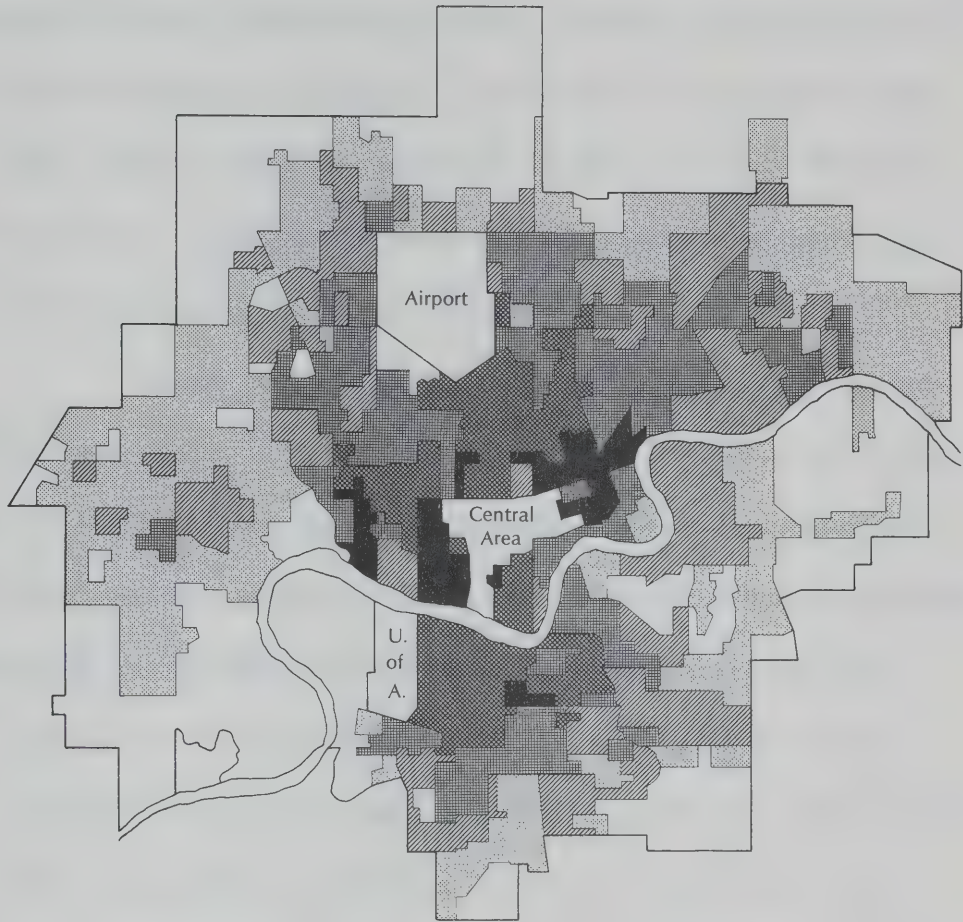
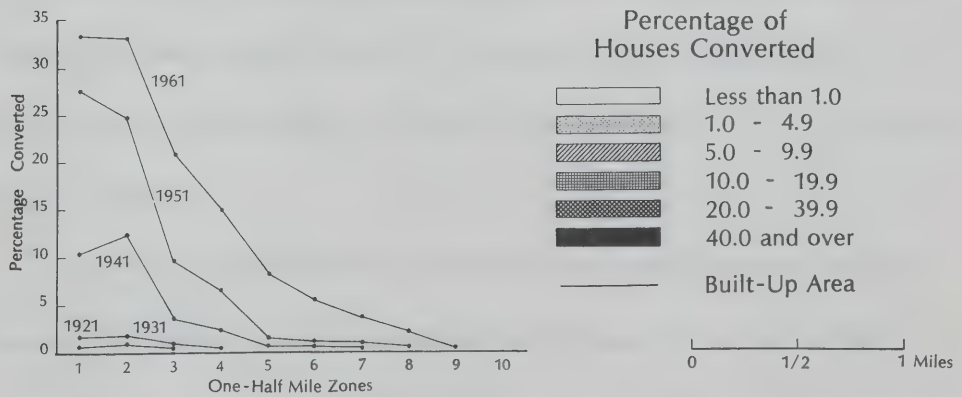


Figure 12  
DISTRIBUTION OF CONVERTED  
DWELLINGS, 1961  
(ALL TYPES)



Source: Assessor's Department,  
City of Edmonton,  
1970-71



the houses had been converted by 1961. However, important variations were beginning to emerge. Conversion had started to wane in the inner-city and was now focussed in areas of post-1940 housing. This shift is particularly noticeable in those neighbourhoods which lie just south of the airport (Figure 13).

In contrast to the previous period of active change, the 1960s were featured by apparent stability. In fact, comparison of Figures 12 (1961) and 14 (1971) reveals a lessening in the intensity of the transition pattern. The proportion of converted dwellings decreased in nearly 40 percent of the enumeration areas in the 1960s, whereas less than 1 percent had shown losses during the 1950s. Moreover, few parts of the city displayed conversion rates greater than 5 percent, as a hiatus in conversion activity was apparently reached (Figure 15). This cessation and the reduced intensity of the pattern can largely be explained by two inter-locking factors: first, more converted dwellings were redeveloped than single-family houses; and second, reconversion occurred at a greater rate than conversion. These explanations will be treated in subsequent sections.

The development of Edmonton's conversion pattern confirms the hypothesis expressed in the classical urban growth models; that is, conversion will disperse concentrically from major





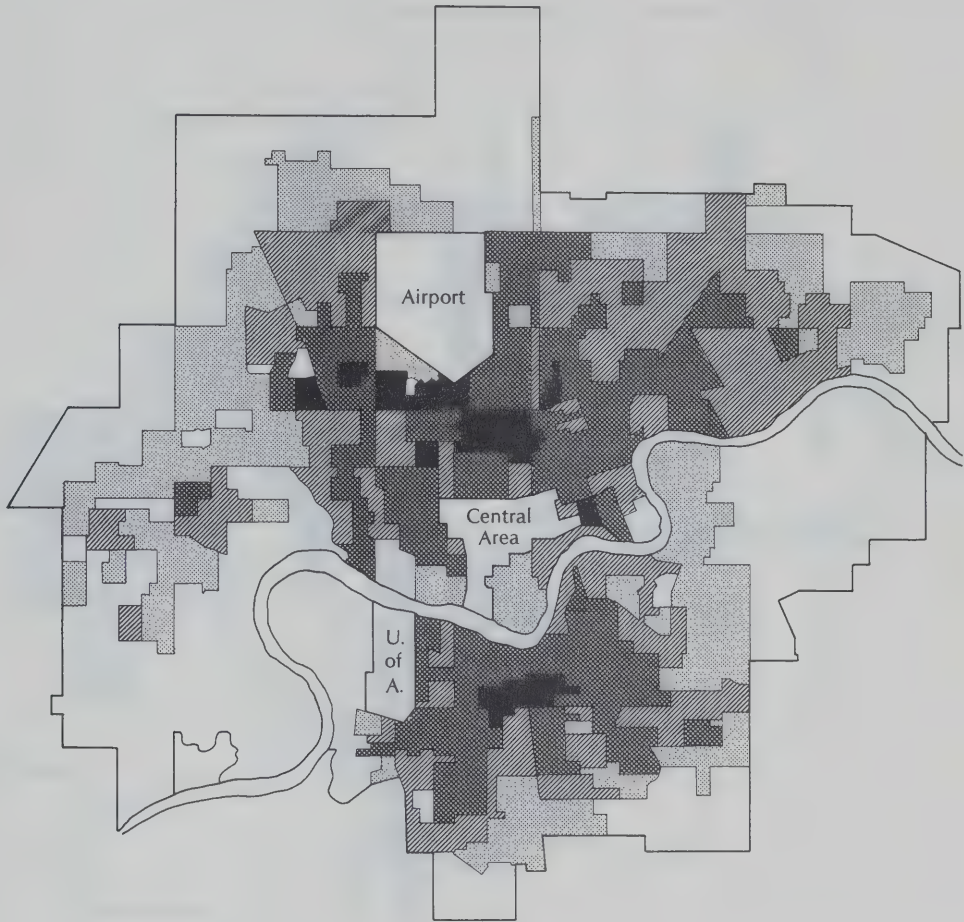
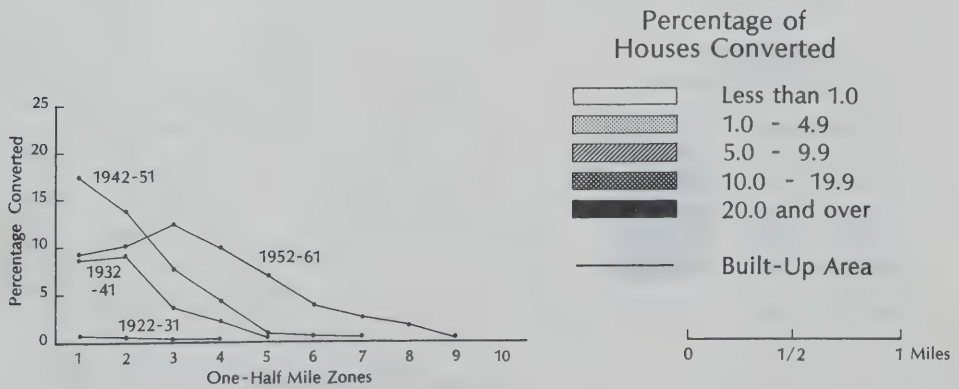


Figure 13  
LOCATION OF CONVERSION  
ACTIVITY, 1952-1961  
(ALL TYPES)



Assessor's Department,  
City of Edmonton,  
1970-71



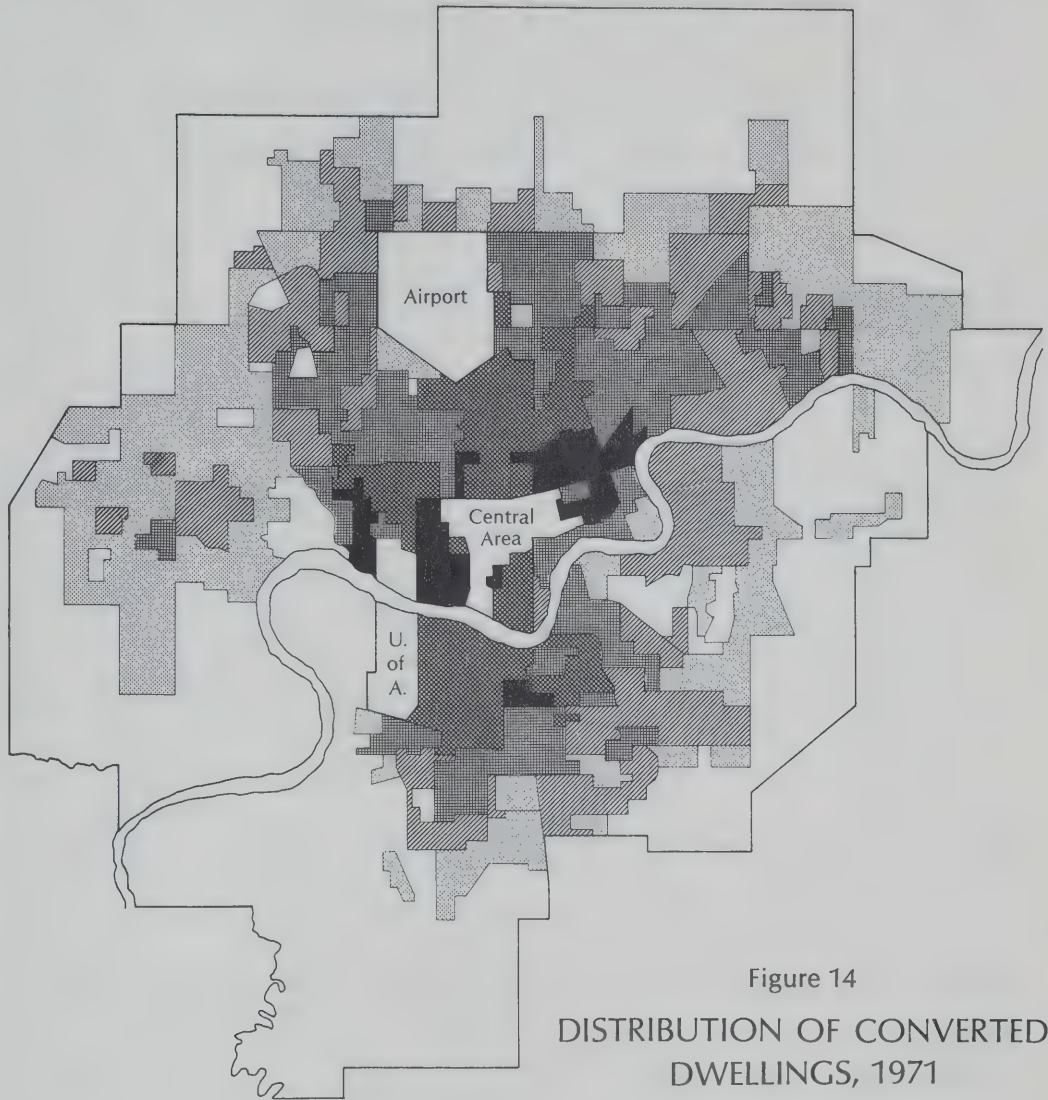
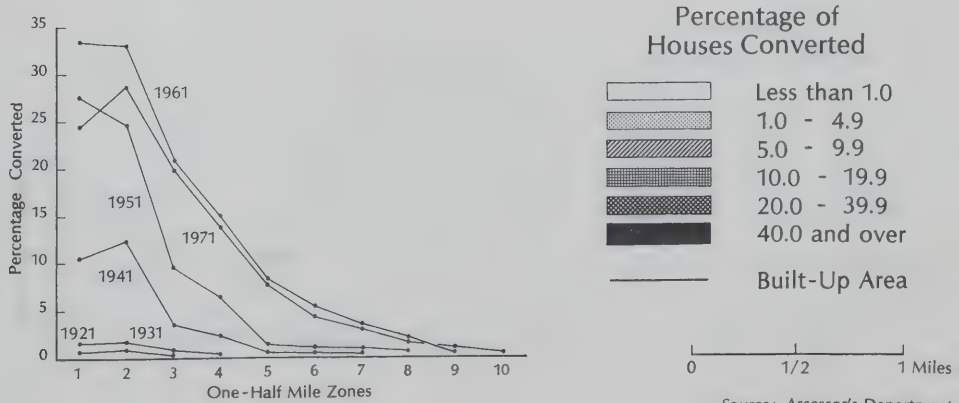


Figure 14  
DISTRIBUTION OF CONVERTED  
DWELLINGS, 1971  
(ALL TYPES)



Source: Assessor's Department,  
City of Edmonton,  
1970-71





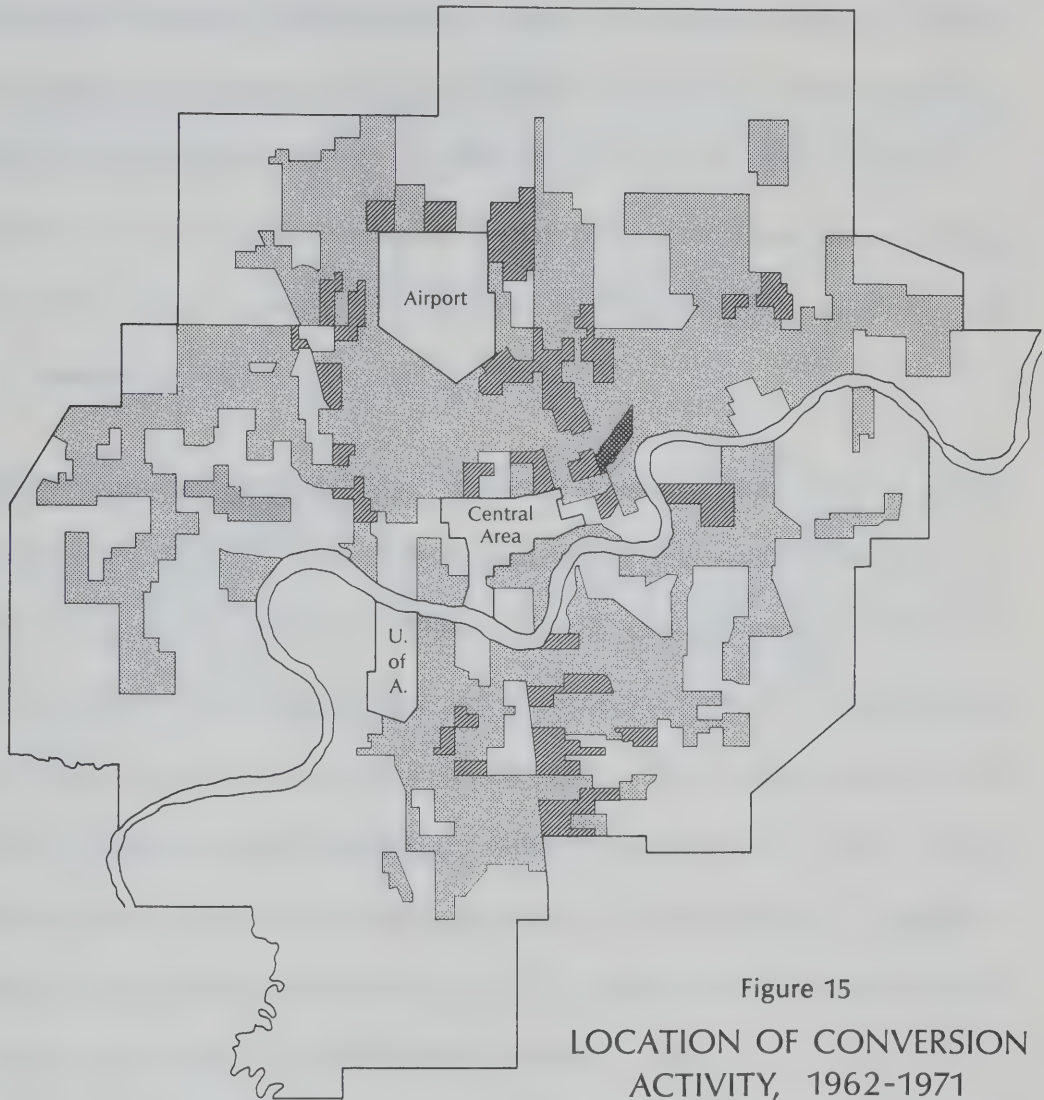
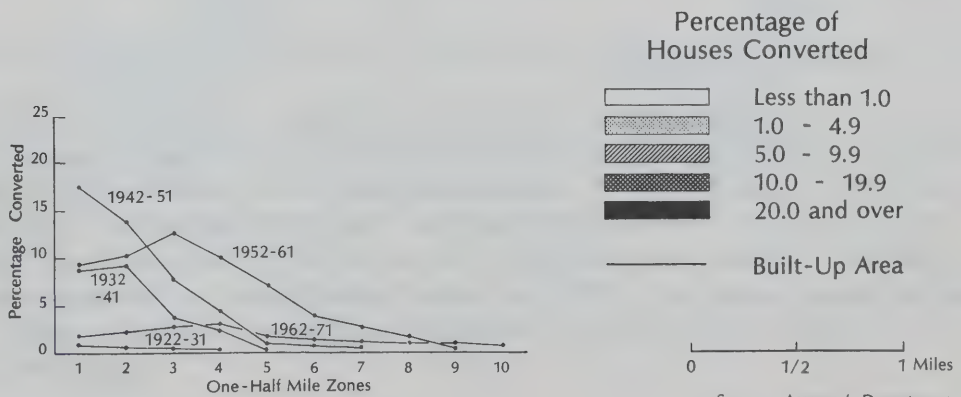


Figure 15  
LOCATION OF CONVERSION  
ACTIVITY, 1962-1971  
(ALL TYPES)



Source: Assessor's Department,  
City of Edmonton,  
1970-71



development nodes (especially the central business district), while at all times the highest density of subdivided houses will be found within the innermost zones. In addition, the data go beyond this premise to reveal that during the later phases of a pattern's development the focus of change may shift away from the central area, and that expansion can be arrested.

Multiple-Family Conversions. From Figures 16 and 17 it is clear that multiple-family conversions controlled the initial development of the transition pattern.<sup>13</sup> They ring the central business district and are found in the university and Strathcona areas, often dominating the land use structure in some blocks. The maps further reveal that their spread has been mainly confined to the inner-city, which is due in part to the controlling influence of morphology. Multiple suites are associated with the large, two storey houses which characterize those parts of Edmonton settled by 1921.

Despite this constraint, multiple conversions reflect

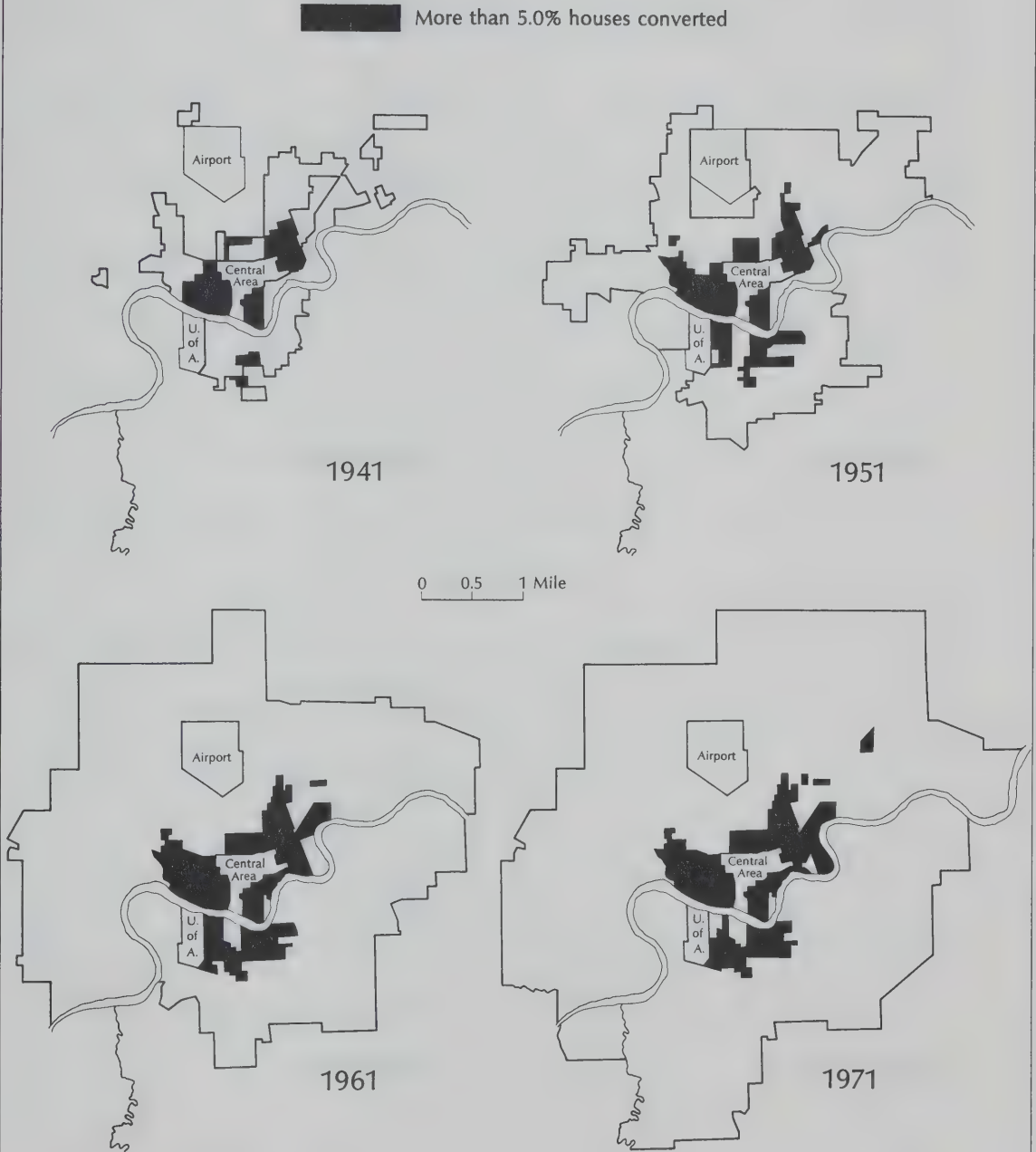
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<sup>13</sup>The distribution maps which show the emergence of the pattern have been generalized to include only those areas in which 5 percent or more of the houses are multiple suites. This criteria was chosen arbitrarily, although there are very few areas with less than this total and they generally lie adjacent to the mapped areas. Further, because conversion was limited prior to 1941, the maps begin at this date. This procedure was also followed for the other types of converted dwellings.





Figure 16  
DISTRIBUTION OF MULTIPLE-FAMILY CONVERTED DWELLINGS  
1941-1971

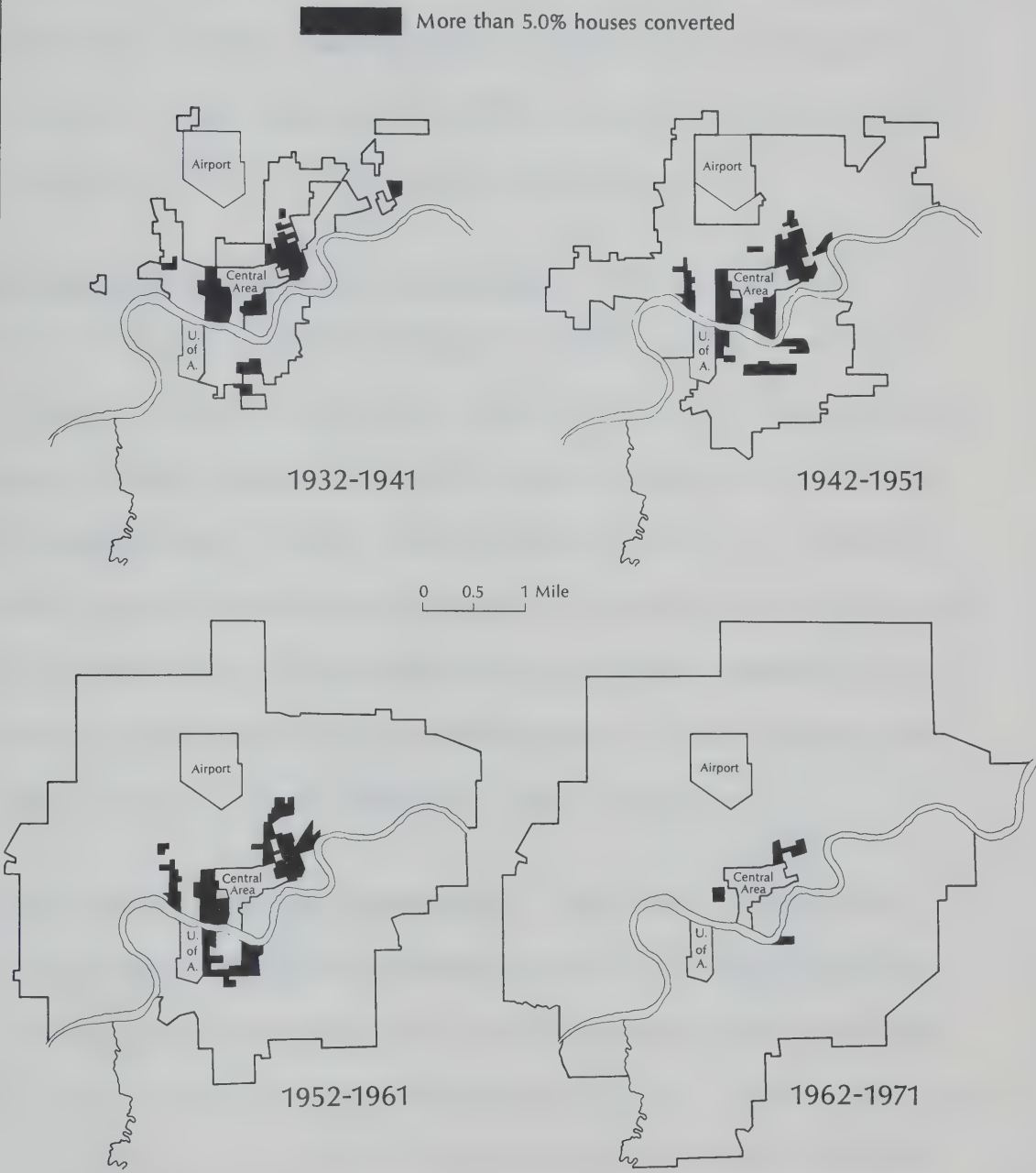


Source: Assessor's Department,  
City of Edmonton,  
1970-71

— Extent of built-up area



Figure 17  
LOCATION OF MULTIPLE-FAMILY CONVERSION ACTIVITY  
1932-1971



Source: Assessor's Department,  
City of Edmonton,  
1970-71

— Extent of built-up area



the diffusion profile of the composite pattern. Significantly, they have moved outwards in a similar and continuous manner. Initially, this dispersal was from two points (the central business district and Strathcona), but by 1951 the patterns had coalesced. In a slight departure, however, they experienced their greatest expansion during the 1940s rather than the 1950s, and except for losses in the innermost zone, their areal extent has not decreased.

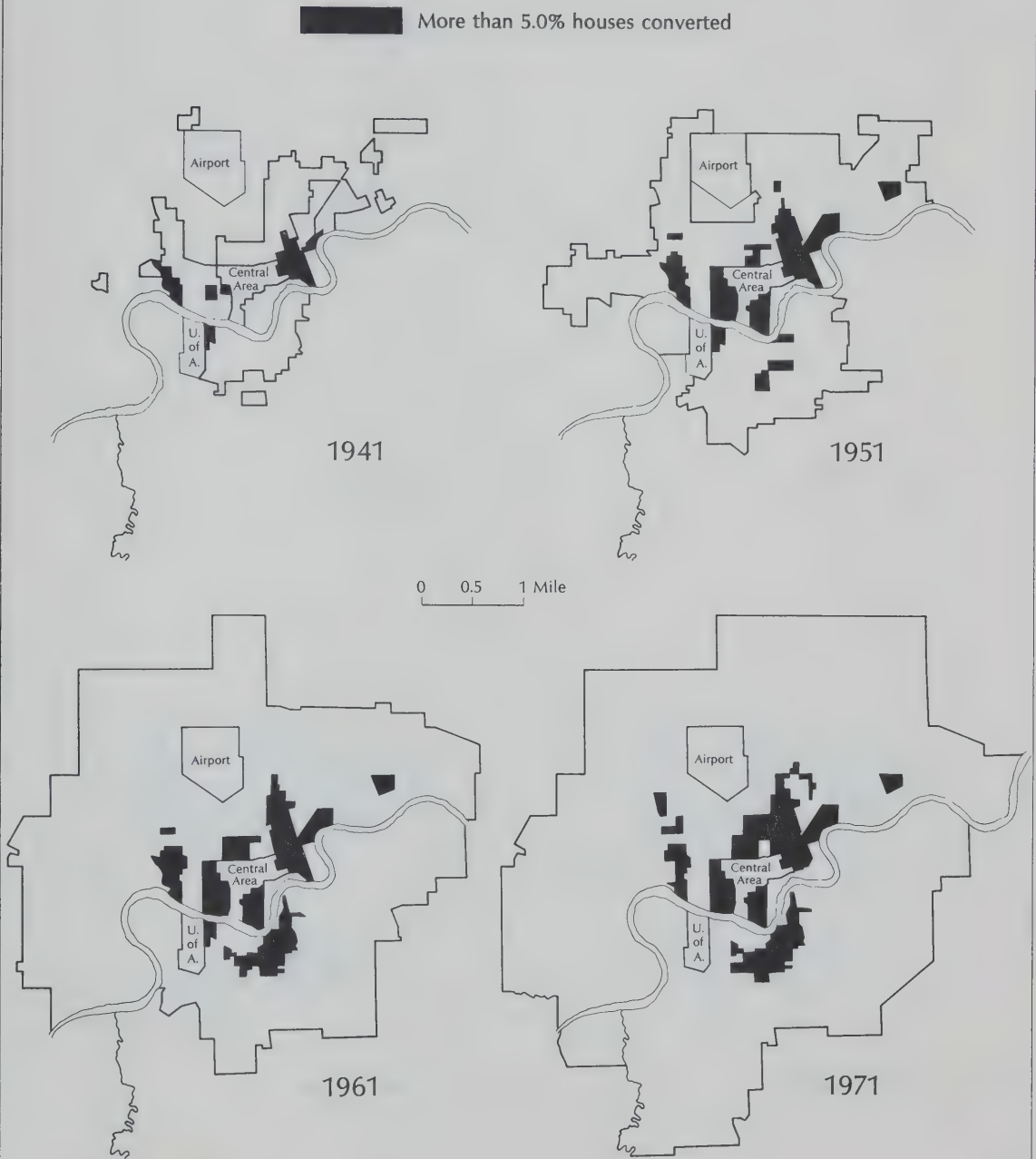
Two-Family Upper-Storey Conversions. This land use type closely mirrors the development pattern of multiple-family conversions. However, unlike multiple suites, upper-storey conversions experienced a slight contraction in their pattern during the 1950s which continued through into the 1960s (Figures 18 and 19). Losses by either redevelopment or reconversion are possible explanations, but the decrease can also be attributed to the further subdivision of this type to contain more than two dwelling units. This upgrading procedure is most common within this land use category.

Two-Family Basement Conversions. Dwellings with basement suites display considerable departures from the total conversion pattern, most noticeably in their virtual absence from areas near the central business district (Figures 20 and 21). Instead, they predominate in a broad zone which lies between one-and-a-half and





Figure 18  
DISTRIBUTION OF UPPER-STOREY CONVERTED DWELLINGS  
1941-1971



Source: Assessor's Department,  
City of Edmonton,  
1970-71

— Extent of built-up area

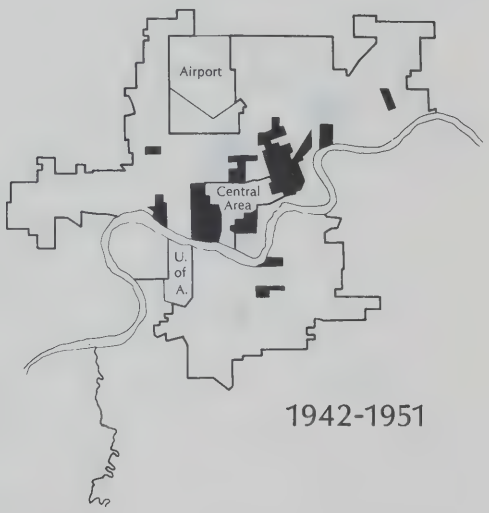


Figure 19  
LOCATION OF UPPER-STOREY CONVERSION ACTIVITY  
1932-1941

More than 5.0% houses converted



1932-1941



1942-1951

0 0.5 1 Mile



1952-1961



1962-1971

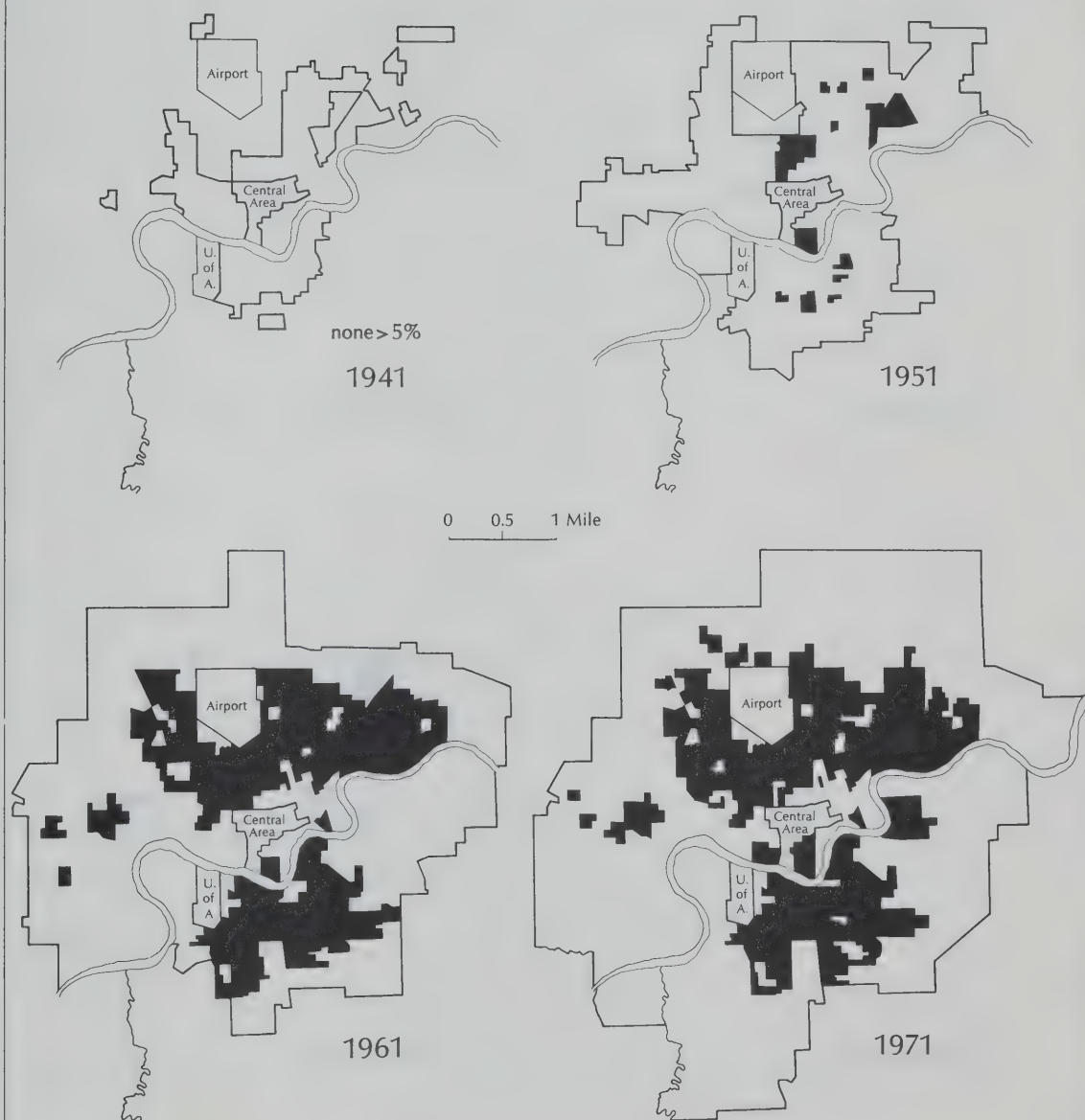
Source: Assessor's Department,  
City of Edmonton,  
1970-71

Extent of built-up area



Figure 20  
DISTRIBUTION OF BASEMENT CONVERTED DWELLINGS  
1941-1971

More than 5.0% houses converted

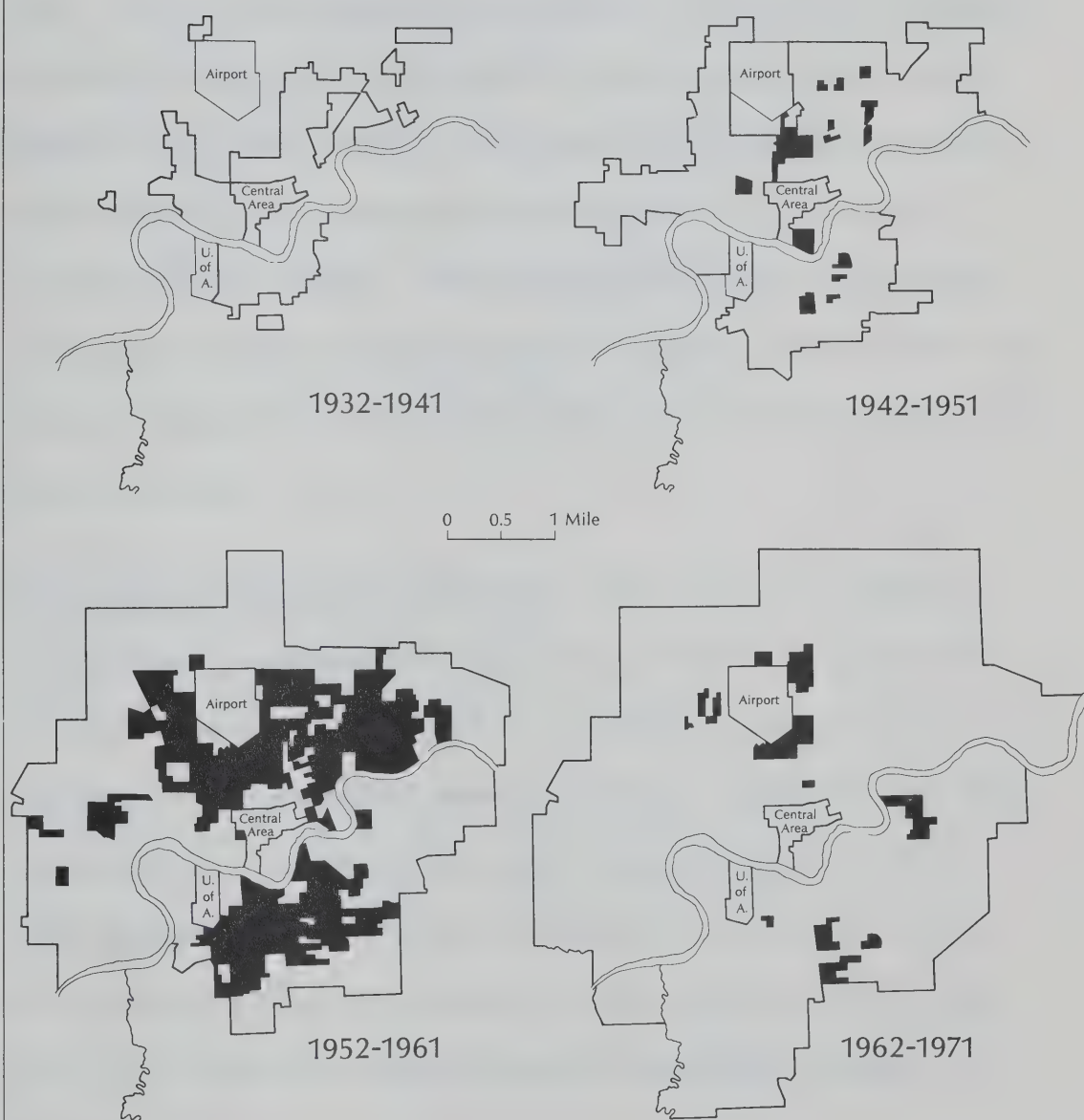


Source: Assessor's Department,  
City of Edmonton,  
1970-71



Figure 21  
 LOCATION OF BASEMENT CONVERSION ACTIVITY  
 1932-1971

More than 5.0% houses converted



Source: Assessor's Department,  
 City of Edmonton,  
 1970-71

— Extent of built-up area





three miles from the central core. This distribution coincides quite closely with the extent of the 1951 built-up area and with the house types constructed during and immediately following World War II.

The appearance of basement conversions on the transition map was both sudden and dramatic in comparison to the other types. From a few scattered occurrences in 1951, their numbers so increased that by 1961 more than 225 enumeration areas counted totals of 5 percent or more. This very substantial increase was responsible for the outward shift and new focus of conversion activity during the 1950s. But, matching the trends of all conversions, their outward march was halted during the 1960s; while a few new areas appear on the 1971 map, many more remained stable or even lost suites.

Other Types of Converted Dwellings. The spatial development of several other processes—the conversion of houses to apartments, the conversion of duplexes, and the upgrading of already converted dwellings to higher-density use—has not been mapped because they constitute only a small portion of the changing land use structure. These processes have taken place during the course of the study period and have been concentrated in older neighbourhoods, especially to the west and to the northeast of the central business district.



## Changing Patterns of the Reconversion Process

It was noted previously that the intensity, and in some cases the areal extent, of the conversion pattern was reduced between 1961 and 1971. Reconversion is a possible explanation. It occurs when a converted dwelling or duplex reverts to a less intense use, which in most cases involves a return to single-family status. In fact, after 1961 the number of reconversions (1,282) slightly exceeded newly converted properties (1,188). Although reconversion is not referred to in previous studies of land use change,<sup>14</sup> it is obviously an important factor which should be recognized when modelling the spatial development of the transition pattern. It contributes to the arrest of transition expansion, particularly in areas where it exceeds new conversion. In Edmonton reconversion has occurred throughout the city, but especially in the outer zones where basement suites predominate (Figure 22).<sup>15</sup> This land use can easily revert to its original single-family status.

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<sup>14</sup>The reconversion of converted dwellings was observed in L. D. McCann, "Processes of Change in Residential Areas in Transition," unpublished M. A. thesis, University of Alberta, 1969, pp. 93-95.

<sup>15</sup>Because peripheral areas had fewer converted dwellings than the inner zones, their reconversion rates could be much higher even though fewer dwellings were reconverted. To help overcome this bias, the upper limit of the map's class intervals was set at 20 per cent and over.



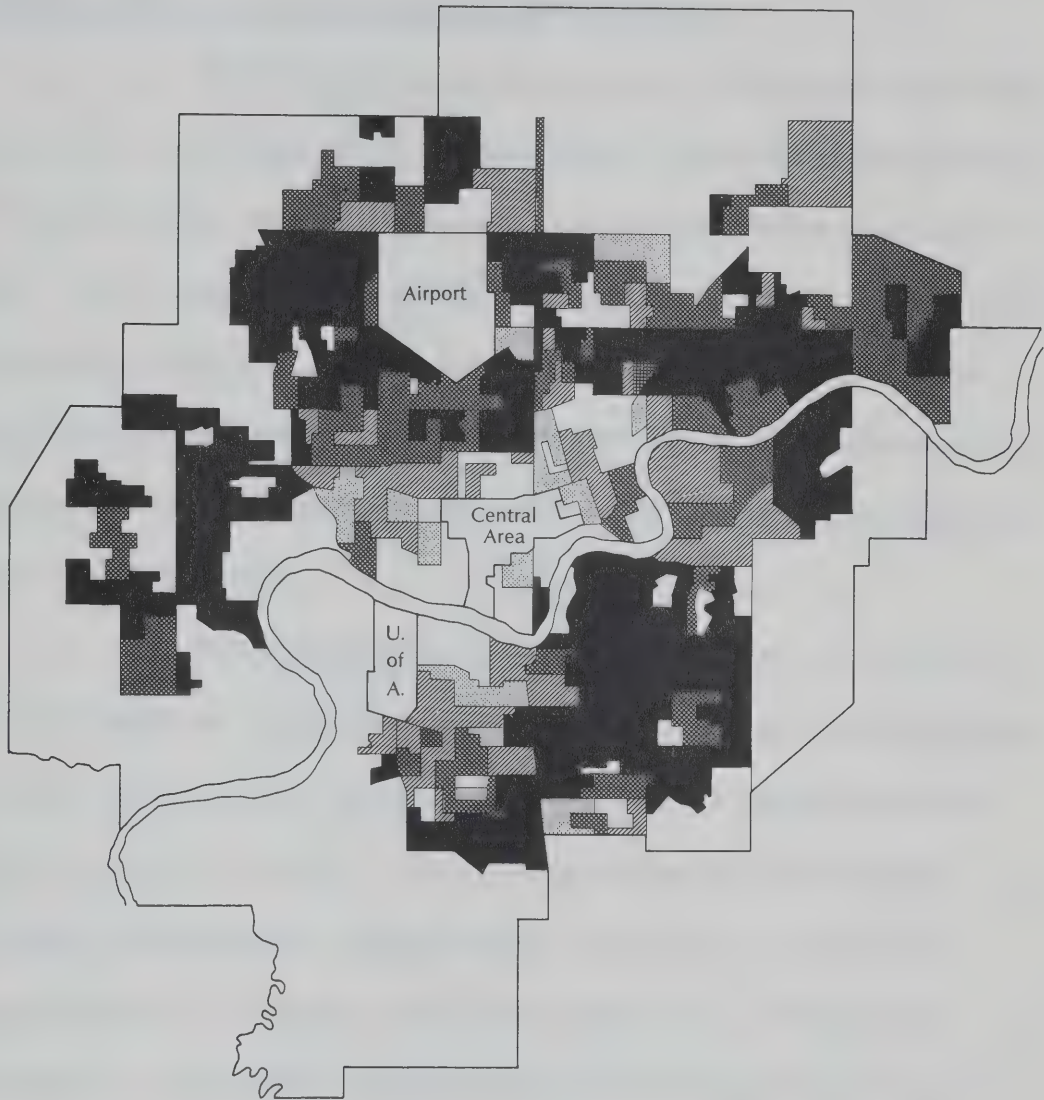


Figure 22

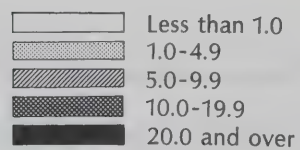
# LOCATION OF RECONVERSION ACTIVITY, 1962-1971 (ALL TYPES)

Limit of Built-Up Area ———

0      1/2      1 Mile

Source: Assessor's Department,  
City of Edmonton,  
1970-71

Percentage of Houses  
Reconverted







## Changing Patterns of the Redevelopment Process

Redevelopment is very recent to Edmonton's development scene, and although its impact on the total residential pattern has been limited, it has completely restructured some parts of the city. The spatial patterns which have emerged are due mainly to the channelling effects of zoning, but there are nevertheless definite, underlying directional biases. To unravel these, the redevelopment analyses followed essentially the same lines as those undertaken for converted properties.

Redevelopment activity was measured by calculating the percentage of residential properties which were replaced during each ten-year period. Mapping distributions for particular dates was less easily resolved. The number of dwelling units added through redevelopment, expressed as a percentage of the total dwelling units in an area, would have been ideal. This proved impossible to determine because the exact number of dwelling units in some areas was unknown. The maps instead show only the number of dwelling units added by redevelopment to a particular date. Spatial patterns are thus biased slightly by the size of an enumeration area.

All Types of Redevelopment. Prior to 1951, Edmonton experienced negligible amounts of residential redevelopment. This is not



surprising because a home builder or an apartment developer, if he desired, could choose from a variety of vacant lots within close proximity to the principal business nodes. Furthermore, Edmonton was still a young city with little obsolete housing to be replaced.

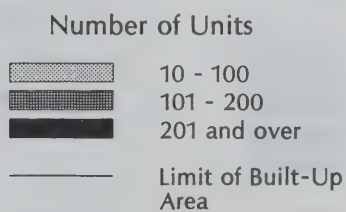
When redevelopment did take place during the 1950s, it was at first widely scattered and typically involved the spot replacement of older properties by single-family and duplex dwellings, but by 1961 the outlines of several important redevelopment areas were apparent (Figures 23 and 24). Not unexpectedly, these were located near the central business district. One small apartment area lay immediately south of the core. Another, separated from the first by business and institutional uses, trended west in sector-like fashion along the crest of the river valley, while a third was situated to the north across the railway tracks. Outliers included the arterial development forming along 124 Street and Jasper Avenue, but no clusters had yet appeared on the southside.

However, the University-Strathcona area did emerge as an important focal point for redevelopment during the 1960s (Figures 25 and 26). Between 1962 and 1971, the downtown areas were further marked by intensification and, to a certain extent, lateral expansion, as they pushed beyond the constraints of previously imposed zoning boundaries. More than 12,000 dwelling units were





Figure 23  
DISTRIBUTION OF DWELLING UNITS  
ADDED BY REDEVELOPMENT TO 1961  
(ALL TYPES)



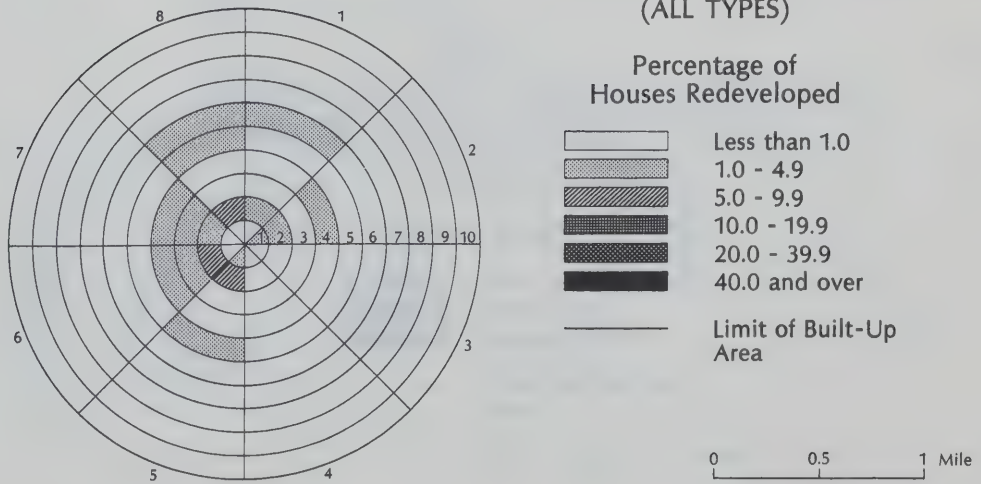
0 0.5 1 Mile





Figure 24

LOCATION OF REDEVELOPMENT  
ACTIVITY, 1952-1961  
(ALL TYPES)







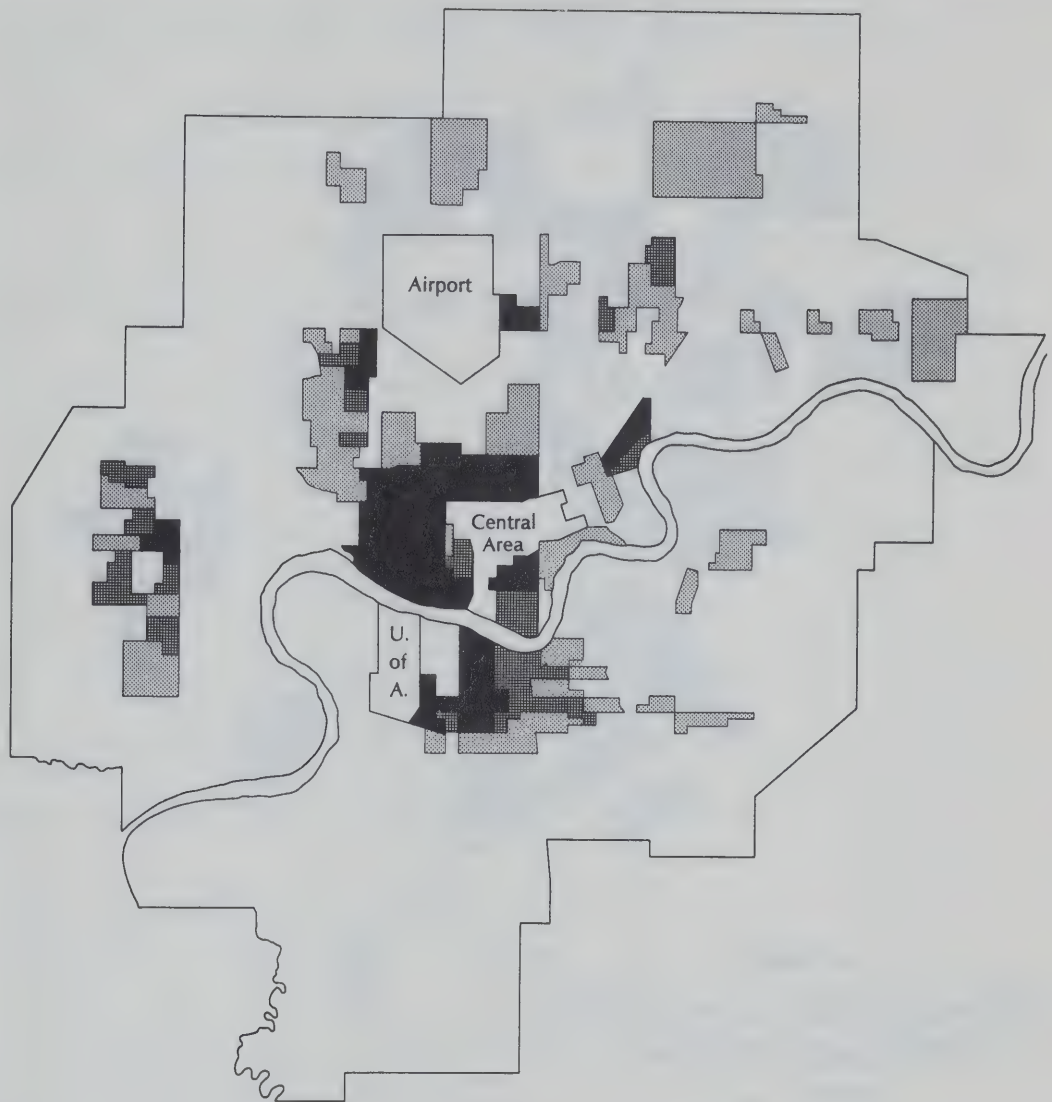
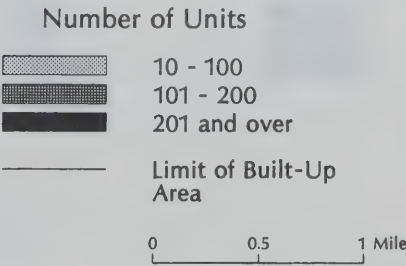


Figure 25

DISTRIBUTION OF DWELLING UNITS  
ADDED BY REDEVELOPMENT TO 1971  
(ALL TYPES)





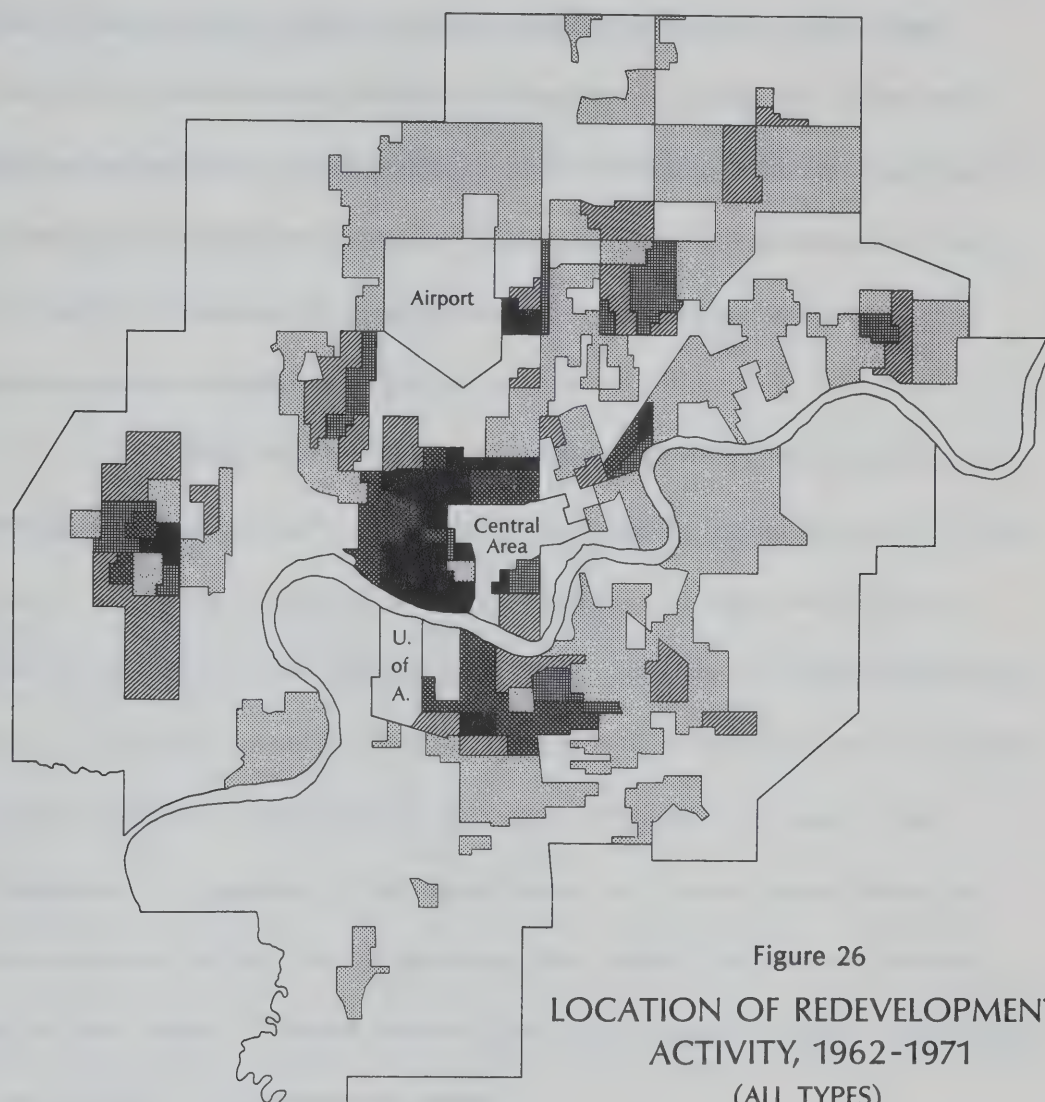
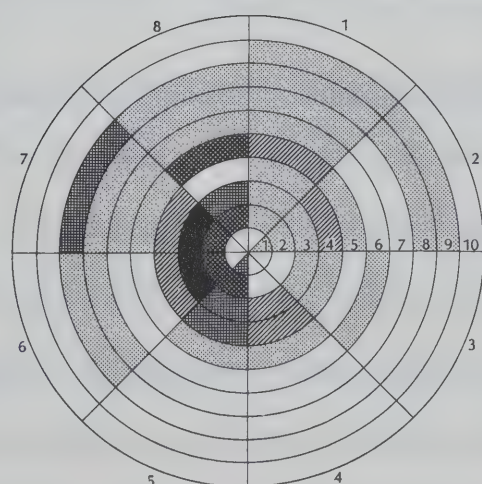
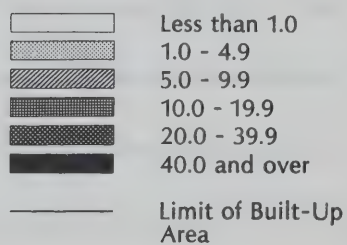


Figure 26  
LOCATION OF REDEVELOPMENT  
ACTIVITY, 1962-1971  
(ALL TYPES)



Percentage of  
Houses Redeveloped



0 0.5 1 Mile



added in these areas, and in some central locations more than 50 percent of the housing stock was replaced. Similar rates were experienced near the Jasper Place and Northern Alberta Institute of Technology development nodes. Although partly concealed by the enumeration framework, major access routes also attracted considerable redevelopment activity.

With few exceptions, redevelopment has taken place in transition areas previously characterized by some amount of conversion, although certainly not all conversion areas have experienced large-scale redevelopment. For example, it has shunned the heavily converted zone of discard which lies to the east of the central business district, even though this area is zoned for apartment development. Generally, the directions and movements taken by redevelopment reflect the clustering and radial tendencies postulated in the model. These biases are more apparent when individual redevelopment forms are examined.

High Rise Apartment Redevelopment. High rises predominate in a sector-shaped area which runs west of the central business district. At one time this was Edmonton's high-rent neighbourhood and is therefore offered as persuasive evidence in support of the Hoyt hypothesis. In addition, though, high rises are clustered near the University of Alberta and in an area to the west of the Legislative







Buildings. This particular area was originally part of the high-rent district, but institutional and business uses built in the early 1950s now separate it from that sector. High rise buildings are also situated on sites along Jasper Avenue and Saskatchewan Drive which command splendid views of the river valley. Their directional bias is convincingly that of radial growth and movement away from major functional centres, especially the central business district (Figures 27-30).

Walk-Up Apartment Redevelopment. Walk-up apartments show more dispersed locational tendencies than high rises. Major concentrations of these two, three and four storey buildings are centred upon the central, Strathcona and Jasper Place business communities and upon the Northern Alberta Institute of Technology. They are also strung along 82, 124, 149 and 156 Streets and 82 and 118 Avenues. Appearing first in the late 1950s on all but the east side of the central core, walk-ups soon pushed outwards, following definite radial gradients, particularly towards the northwest. Since 1961 these development trends have continued but, in addition, walk-up redevelopment has leapt over intervening neighbourhoods to cluster around outlying business and institutional centres (Figures 27-30). This departure supports Bourne's observation that redevelopment is not a spatially continuous phenomenon.



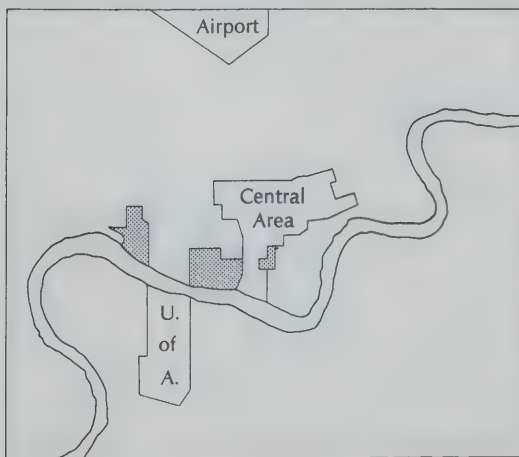
**A WALK-UP APARTMENT  
REDEVELOPMENT**



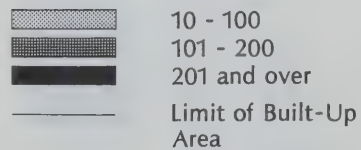
Figure 27

**DISTRIBUTION OF DWELLING UNITS ADDED  
BY WALK-UP AND HIGH RISE APARTMENT  
REDEVELOPMENT TO 1961**

**B HIGH RISE APARTMENT  
REDEVELOPMENT**



**Number of Units**



Source: Assessor's Department, City of Edmonton, 1970-71

0 0.5 1 Mile



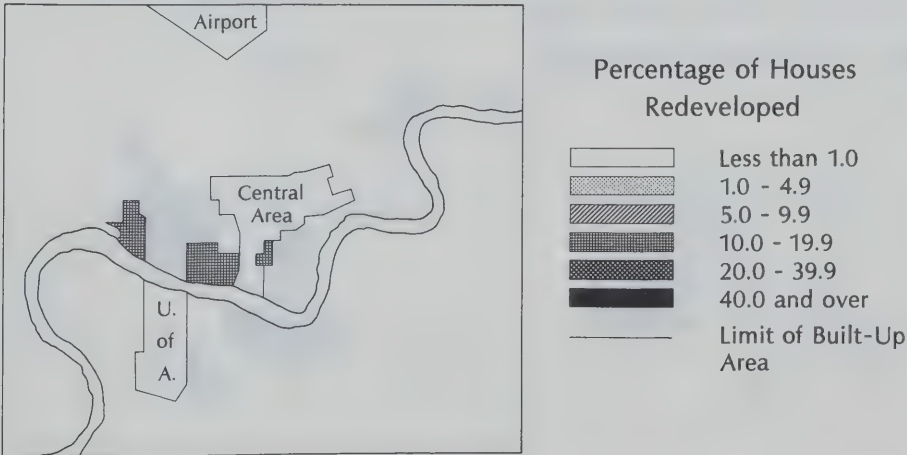
A WALK-UP APARTMENT  
REDEVELOPMENT



Figure 28

LOCATION OF WALK-UP AND HIGH RISE  
APARTMENT REDEVELOPMENT ACTIVITY,  
1952-1961

B HIGH RISE APARTMENT  
REDEVELOPMENT



Source: Assessor's Department, City of Edmonton, 1970-71

0 0.5 1 Mile



**A WALK-UP APARTMENT  
REDEVELOPMENT**



**B HIGH RISE  
APARTMENT  
REDEVELOPMENT**

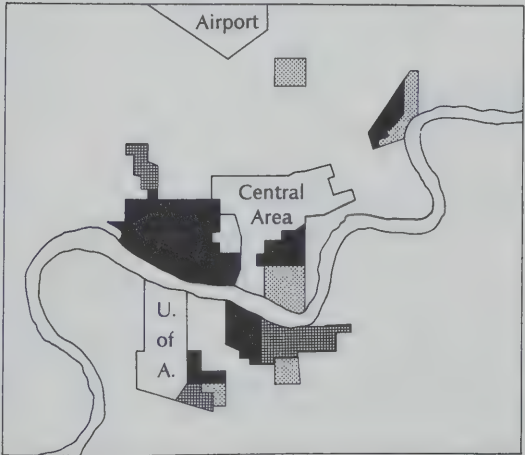
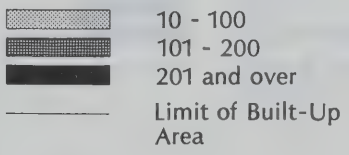


Figure 29  
**DISTRIBUTION OF  
DWELLING UNITS ADDED BY WALK-UP  
AND HIGH RISE APARTMENT  
REDEVELOPMENT TO 1971**

**Number of Units**



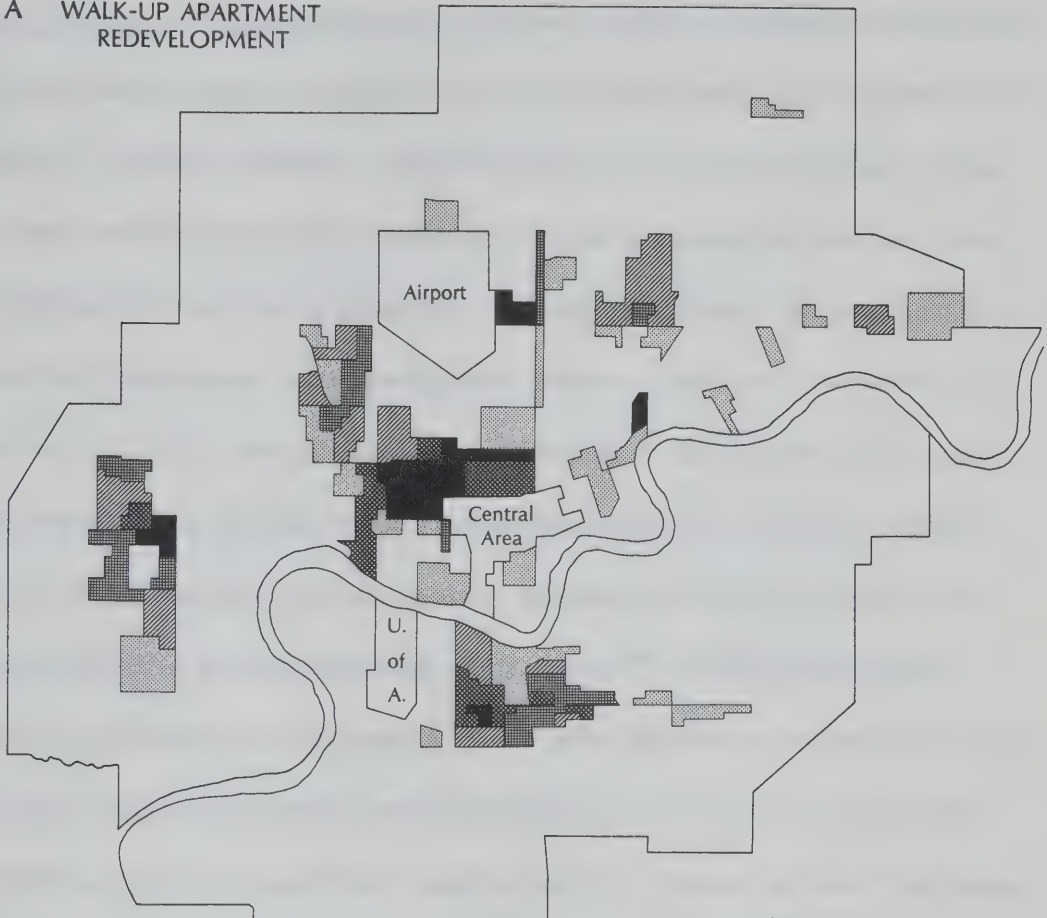
Source: Assessor's Department, City of Edmonton, 1970-71







**A WALK-UP APARTMENT  
REDEVELOPMENT**



**B HIGH RISE  
APARTMENT  
REDEVELOPMENT**

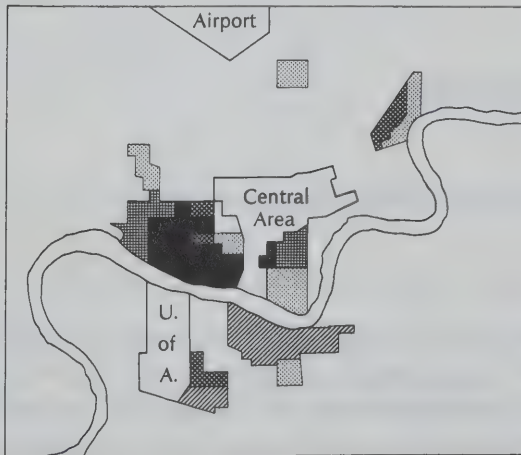
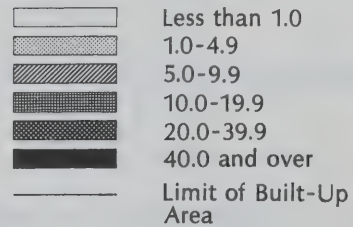


Figure 30

**LOCATION OF WALK-UP  
AND HIGH RISE APARTMENT  
REDEVELOPMENT ACTIVITY,  
1962-1971**

**Percentage of  
Houses Redeveloped**



Source: Assessor's Department, City of Edmonton, 1970-71

0 0.5 1 Mile



Other Types of Redevelopment. Single-family and duplex redevelopment has taken place throughout the city so the pattern is essentially random. For this reason, and because these redevelopment forms have not contributed specifically to transition area formation, their distribution has not been mapped. It can be inferred from Figures 24 and 26, however. One particular feature, related to redevelopment on the city's periphery, is nevertheless important and requires explanation. To escape higher taxes and stricter building regulations, it was common in the prairie cities for shoddy houses to be built beyond the political limits of the city.<sup>16</sup> In Edmonton such housing was built mainly during the 1930s and 1940s and particularly in Jasper Place and on the northern fringe of the city. Since the mid-fifties these houses have been slowly replaced by new dwellings, sometimes even by single-family residences, explaining the occurrence of redevelopment well away from the city's older neighbourhoods.

## SUMMARY

The spatial movement and directional biases postulated

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<sup>16</sup>P. J. Smith, "Changing Forms and Patterns in the Cities," in *idem*, ed., The Prairie Provinces, Studies in Canadian Geography, published for the 22nd International Geographical Congress, Toronto, University of Toronto Press (in press).



in the model are generally validated by the Edmonton data. Conversion does indeed initiate the spatial development of the transition pattern and, through time, disperses concentrically and in a continuous outward progression from the major development nodes. Redevelopment, on the other hand, diffuses sectorally or radially from these same nodes and is spatially discontinuous.

The central business district is the focal point for transition area development in Edmonton (Figure 31). Conversion began near this nucleus as early as the 1920s and, although minor discrepancies are discernible, it has since pushed outwards in a generally unbroken and concentric fashion. Redevelopment has also expanded from the central core, but its growth has been restricted to specific radial corridors. For example, it has avoided the zone of discard in favour of the westerly trending high-rent sector. In addition, redevelopment has jumped over areas to cluster around outlying business and institutional centres, confirming that it is spatially discontinuous.

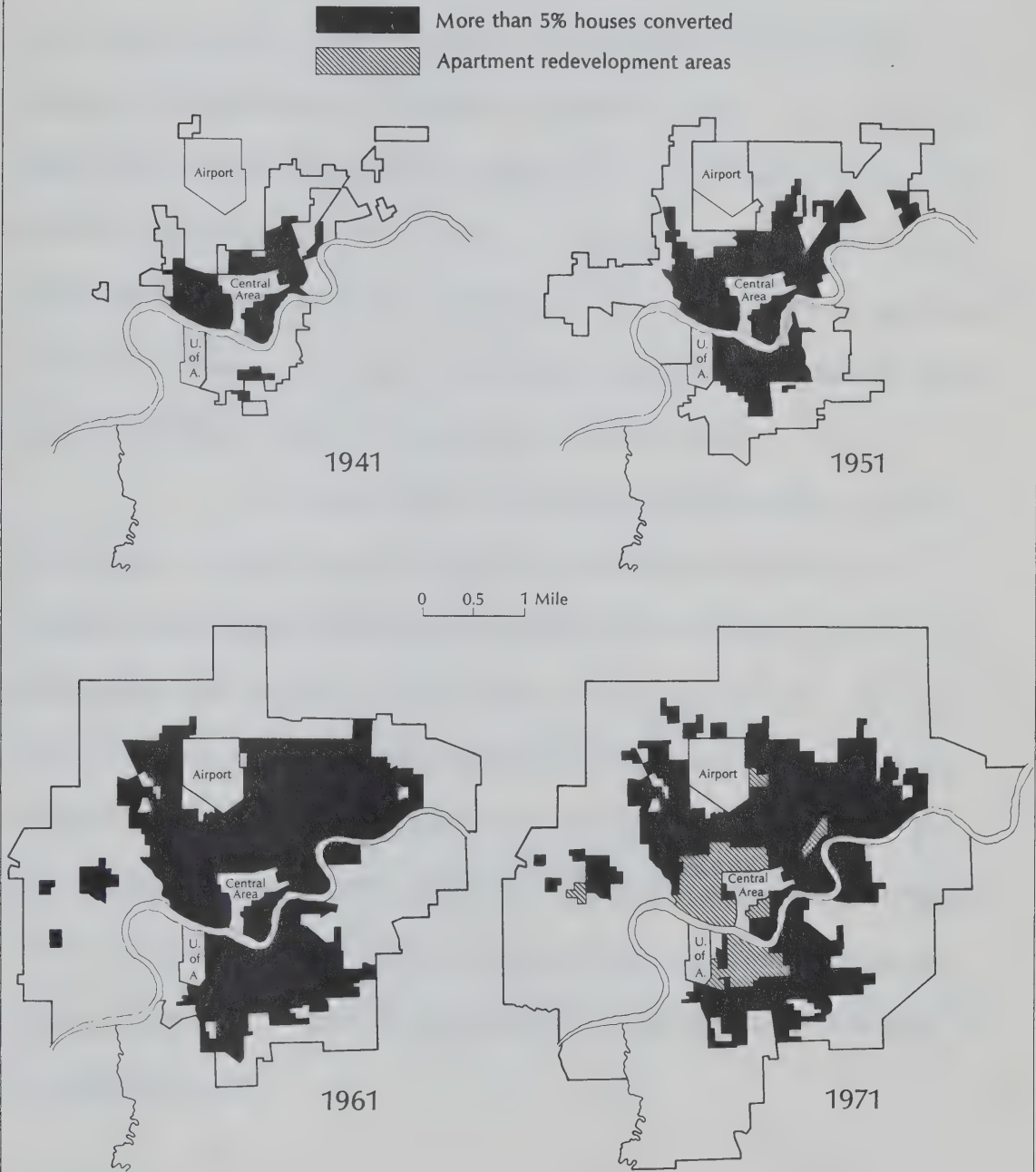
Other findings need to be incorporated into an expanded model. These show that pattern formation is spatially differentiated by particular forms of conversion and redevelopment. Upper-storey and multiple-family conversions, for example, predominate in older districts, whereas basement suites are more





Figure 31

# SPATIAL DEVELOPMENT OF THE EDMONTON TRANSITION PATTERN 1941-1971



Source: Assessor's Department,  
City of Edmonton,  
1970-71



characteristic of post-1940 housing areas. Significant, too, is the finding that the focus of change, particularly of conversion activity, shifts away from the central area in the later phases of a pattern's development. Further, when redevelopment is superimposed on the transition pattern, conversion and redevelopment areas do not expand simultaneously as initially assumed. In fact, as redevelopment became a major force of change, the proportion of converted dwellings decreased in some areas. Reconversion was one factor which caused this, but more important, it is probable that apartment construction alone met the demand for rental accommodation, making the dwelling conversion process less necessary.

A revised model of the spatial development of transition areas, while incorporating these additional findings, also requires information about those location factors which influence the distribution and spread of conversion and redevelopment. Specifically, are there physical characteristics of an area's morphology which are particularly associated with transition processes? The ways in which housing characteristics have influenced the emergence of the transition pattern will be examined when the conversion and redevelopment processes are analyzed. Their analysis will lead to an expanded model.



## Chapter IV

THE SEQUENTIAL DEVELOPMENT OF RESIDENTIAL  
AREAS IN TRANSITION

The sequence of land use and physical changes which characterizes the development of transition areas remains largely unrecorded. As Bourne notes, "... land use change and the succession of uses which occupy units of urban space are nominees for the most cited but least understood aspects of the dynamics of urban spatial structure."<sup>1</sup> Several authors have postulated stages in the social occupance of neighbourhoods, but their studies have seldom examined the succession of changes in the housing stock.<sup>2</sup> One exception is the Hoover-Vernon model of neighbourhood evolution, in which a cycle of single-family development, apartment construction, conversion, deterioration and renewal is outlined.<sup>3</sup> The validity of this model, as a basis for describing the sequence of change in

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<sup>1</sup>L. S. Bourne, "Physical Adjustment Processes and Land Use Succession: A Conceptual Review and Central City Example," Economic Geography, vol. 47, 1971, p. 1.

<sup>2</sup>See for example O. D. Duncan and B. Duncan, The Negro Population of Chicago, Chicago, University of Chicago Press, 1957, 367 pp.; and W. F. Smith, "Forecasting Neighbourhood Change," Land Economics, vol. 39, 1963, pp. 292-297.

<sup>3</sup>E. M. Hoover and R. Vernon, Anatomy of a Metropolis, New York, Doubleday, 1959, 338 pp.



transition areas, is evaluated in this chapter. The concept of land use succession is introduced as a method for measuring the transition sequence.

## A STAGE MODEL OF TRANSITION AREA DEVELOPMENT

Although conceived as growth models, the residential theories of Burgess and Hoyt pay little attention to the cycle of land use and physical changes which is experienced by particular neighbourhoods. In fact, the first real attempt to conceptualize this sequence was made only as recently as 1959 by Hoover and Vernon in their book, Anatomy of a Metropolis.<sup>4</sup> After describing the trends and forces which they observed in the New York metropolitan area, they suggested a five-stage model of residential change.

Stage 1 - Initial residential development is in single-family houses.

Stage 2 - Transition, in which there is substantial new construction and population growth, but in which a high and increasing proportion of the new housing is apartments, so that average density is increasing. Much of the apartment construction replaces older single-family houses.

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<sup>4</sup>Ibid. The following description of the model is extracted from pp. 183-198.





Stage 3 - Down-grading, in which old housing (both multi-family and single) is being adapted to greater-density use than it was originally designed for. In this stage there is usually little actual construction, though there is some population and density growth through conversion and crowding of existing structures. There may be a certain amount of new construction too, involving the replacement of single-family homes by apartment houses at the same time that other structures are being subdivided.

Stage 4 - Thinning-out, in which density and occupancy are gradually reduced as the result of decline in household size, abandonment and demolition. This stage is characterized by little or no residential construction and by decline in population.

Stage 5 - Renewal, in which obsolete areas of housing, after arriving at Stage 4, are being replaced by new multi-family housing, either in the form of government subsidized housing, or less frequently, privately financed luxury apartments.

Besides focussing on housing changes, Hoover and Vernon also began to relate changes in household characteristics and the migration of different socio-economic groups to the evolution of neighbourhoods. For example, they noted a shift from a white to a black population paralleling a change from Stage 2 to Stage 3. Research spurred by the Hoover-Vernon model has been concerned



primarily with these social aspects, to the neglect of housing changes.<sup>5</sup> However, there is one recent study which has attempted to quantify changes in both the social and the housing make-up of residential areas.<sup>6</sup> Six stages are identified, including (1) rural, (2) first wave of development, (3) fully developed, high quality residential, (4) packing, (5) thinning, and (6) recapture. No reference is made to either conversion or redevelopment, although public renewal is given recognition in the last stage. Omission of these transition processes results from depending on census materials which do not include this type of information.

Previous research in a sample of seven small areas, in which conversion and redevelopment processes were measured, found that the Hoover-Vernon sequence was inappropriate.<sup>7</sup> In particular, dwelling conversion emerged as a distinct phase before

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<sup>5</sup>See for example E. W. Butler and W. J. Barclay, "A Longitudinal Examination of Two Models of Urban Spatial Differentiation: A Case-Study of Los Angeles," Research Previews (University of North Carolina), vol. 14, 1967, pp. 2-25; and B. Duncan, G. Sabagh and M. van Arsdol, Jr., "Patterns of City Growth," American Journal of Sociology, vol. 67, 1962, pp. 418-429.

<sup>6</sup>D. L. Birch, "Toward a Stage Theory of Urban Growth," Journal of the American Institute of Planners, vol. 37, 1971, pp. 78-87.

<sup>7</sup>L. D. McCann, "Processes of Change in Residential Areas in Transition," unpublished M. A. thesis, University of Alberta, 1969, 204 pp.



apartment redevelopment. Limited observations in several other Canadian cities support this finding.<sup>8</sup> To have greater usefulness for theoretical and planning purposes, however, the transition sequence needs to be evaluated for a much larger area. Thus, the validity of the Hoover-Vernon model, as a basis for describing the sequential formation of transition areas, will be tested against data for the entire 1951 built-up area.

## TEMPORAL PROCESSES AND THE FORMATION OF TRANSITION AREAS

### Land Use Succession in Transition Areas

The concept of succession was initially formulated by plant and animal ecologists to describe the evolution of natural communities by sequent replacement. In the 1920s it was adopted by Park and fellow sociologists at the University of Chicago to refer to the sequential occupance of a neighbourhood by different social

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<sup>8</sup>While examining other facets of residential change, several authors have observed this sequence. See for example L. S. Bourne, Private Redevelopment of the Central City, Research Paper No. 112, Department of Geography, University of Chicago, 1967, pp. 46-47; R. McAfee, "Residence on the Margin of the Central Business District: A Case Study of Apartment Development in the West End of Vancouver, B. C.," unpublished M. A. thesis, University of British Columbia, 1967, 133 pp.; and J. Wolforth and R. Leigh, Urban Prospects, Toronto, McClelland and Stewart, 1971, p. 97.





groups or land use activities.<sup>9</sup> Social succession is the invasion and occupation of a residential area by a new group of people and the reciprocal withdrawal of the previous population. Land use succession, on the other hand, refers to the change from one activity to another in the occupancy of land.<sup>10</sup> The major residential land use succession processes include development on vacant land, conversion, reconversion and redevelopment, and their measurement indicates the order of change in the sequential development of transition areas.

#### Measurement of Land Use Succession

To measure land use succession, it is necessary to compare individual properties at specific time intervals. For the 1951 built-up area, tables were prepared which show the properties of each land use type which underwent change or remained stable (unchanged) during each ten-year period between 1921 and 1971. A property was examined and its initial land use code compared against its code at the end of the period. Then, both the respective

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<sup>9</sup>For a discussion of urban ecological theory see L. Reissman, The Urban Process, New York, The Free Press, 1964, pp. 122-150.

<sup>10</sup>For a discussion of land use succession in a geographic context see L. S. Bourne, "Physical Adjustment Processes," op. cit., pp. 2-3.



number of properties and land area (measured in square feet) were entered in land use succession matrices (Tables 11-15). These tables show only the land area, which is a more accurate measure of change than property numbers. In total, nearly 35,000 properties were examined in each period, providing a detailed and comprehensive picture of land use succession through time, and therefore of transition area formation.

The succession matrices are interpreted in the following manner. In a row for a particular land use, each cell measures the land area which changed to another use. The summation of each of these cells yields the total area which was transferred out to other uses. When this amount is subtracted from the land area of this type which existed at the beginning of the period, the result is the amount of land which remained stable or unchanged during the period. Distribution of new land occupance, or the land area which was transferred into new uses, is found by reading down the columns. The difference between the row summation (land transferred out) and the column summation (land transferred in) represents the net change of each land use. When this result is added to (if a net gain) or subtracted from (if a net loss) the original total, the new land area for this use at the end of the period is determined. The summation of each cell in the land use matrix



TABLE 11

LAND USE SUCCESSION MATRIX, 1951 BUILT-UP AREA, 1922-1931  
(AREA IS IN THOUSANDS OF SQUARE FEET)

1921 Land Uses	1931 Land Uses													1921 Land Use Total		
	SF	BC	USC	MFC	D	DC	RH	RTH	WAC	WA	HRA	V	NR	Total Change	Stable	Total
1 SF <sup>1</sup>	-	-	78	182	-	-	-	-	-	-	-	-	-	260	46945	47206
2 BC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3 USC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11	11
4 MFC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	22	22
5 D	-	-	-	-	-	-	-	-	-	-	-	-	-	-	407	407
6 DC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7 RH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	200	200
8 RTH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	62	62
9 WAC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10 WA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	485	485
11 HRA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12 V	1924	-	-	5	196	-	35	52	-	72	-	-	-	20285	137821	158106
13 NR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Totals	1924	-	78	187	196	-	35	52	-	72	-	-	-	20545	185956	206502

<sup>1</sup>Key to land use classification: 1 SF - Single-family residences; 2 BC - Basement conversions; 3 USC - Upper-storey conversions; 4 MFC - Multiple-family conversions; 5 D - Duplexes; 6 DC - Duplex conversions; 7 RH - Rooming houses; 8 RTH - Row and terrace housing; 9 WAC - Walk-up apartment conversions; 10 WA - Walk-up apartments; 11 HRA - High rise apartments; 12 V - Vacant; 13 NR - Non-residential land use.

Source: Assessor's Department, City of Edmonton, 1970-71.



TABLE 12

LAND USE SUCCESSION MATRIX, 1951 BUILT-UP AREA, 1932-1941  
(AREA IS IN THOUSANDS OF SQUARE FEET)

1931 Land Uses	1941 Land Uses												1931 Land Use			
	SF	BC	USC	MFC	D	DC	RH	RTH	WAC	WA	HRA	V	NR	Total Change	Stable	Total
1 SF	-	60	803	1567	-	-	-	-	-	-	-	-	-	2431	64438	66870
2 BC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3 USC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	89	89
4 MFC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	209	209
5 D	-	-	-	-	-	12	-	-	-	-	-	-	-	12	592	604
6 DC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7 RH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	235	235
8 RTH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	114	114
9 WAC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10 WA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	558	558
11 HRA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12 V	13523	-	-	-	168	-	-	-	-	120	-	-	-	13812	124009	137821
13 NR	-	-	-	-	-	-	-	-	-	10	-	-	-	10	-	-
Totals	13523	60	803	1567	168	12	-	-	-	130	-	-	-	16265	190236	206502

Source: Assessor's Department, City of Edmonton, 1970-71.





TABLE 13

LAND USE SUCCESSION MATRIX, 1951 BUILT-UP AREA, 1942-1951  
(AREA IS IN THOUSANDS OF SQUARE FEET)

1941 Land Uses	1951 Land Uses											Total Change	Stable	1941 Land Use Total		
	SF	BC	USC	MFC	D	DC	RH	RTH	WAC	WA	HRA				V	NR
1 SF	-	1061	2150	2412	-	-	-	-	-	12	-	-	206	5841	72121	77962
2 BC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	61	61
3 USC	4	-	-	25	-	-	-	-	-	-	-	-	-	29	863	893
4 MFC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1777	1777
5 D	-	-	-	-	-	5	-	-	20	-	-	-	-	25	736	761
6 DC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12	12
7 RH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	235	235
8 RTH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	114	114
9 WAC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10 WA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	688	688
11 HRA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12 V	89046	1303	17	54	4801	-	30	412	-	1120	-	-	-	96786	27223	124009
13 NR	-	-	-	4	-	-	-	-	-	13	-	-	-	17	-	-
Totals	89050	2364	2167	2496	4801	5	30	412	20	1145	-	-	206	102699	103830	206511

Source: Assessor's Department, City of Edmonton, 1970-71.



TABLE 14

LAND USE SUCCESSION MATRIX, 1951 BUILT-UP AREA, 1952-1961  
(AREA IS IN THOUSANDS OF SQUARE FEET)

1951 Land Uses	1961 Land Uses													1951 Land Use Total		
	SF	BC	USC	MFC	D	DC	RH	RTH	WAC	WA	HRA	V	NR	Total Change	Stable	
1 SF	538	11863	2221	2123	692	-	-	-	-	597	54	-	1574	19664	141507	161171
2 BC	162	-	-	45	-	-	-	-	-	-	-	-	5	213	2210	2424
3 USC	144	-	-	328	11	-	-	-	-	32	13	-	92	622	2412	3034
4 MFC	20	-	-	-	-	-	-	-	19	6	6	-	83	135	4138	4273
5 D	11	-	-	-	-	35	-	-	19	-	-	-	28	94	5444	5538
6 DC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	16
7 RH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	265	265
8 RTH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	526	526
9 WAC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19	19
10 WA	-	-	-	-	-	-	-	-	-	-	-	-	4	4	1829	1833
11 HRA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12 V	16933	1504	4	-	4367	-	-	216	-	1243	-	-	-	24268	2955	27223
13 NR	5	-	-	-	4	-	-	-	-	64	104	-	-	178	-	-
Totals	17815	13367	2226	2497	5075	35	-	216	38	1942	178	-	1788	45179	161324	206325

Source: Assessor's Department, City of Edmonton, 1970-71.



TABLE 15

LAND USE SUCCESSION MATRIX, 1951 BUILT-UP AREA, 1962-1971  
(AREA IS IN THOUSANDS OF SQUARE FEET)

1961 Land Uses	1971 Land Uses													1961 Land Use Total		
	SF	BC	USC	MFC	D	DC	RH	RTH	WAC	WA	HRA	V	NR	Total Change	Stable	Total
1 SF	1105	2907	742	539	1780	-	-	-	-	7298	1328	95	3523	19318	140004	159322
2 BC	4192	-	-	84	-	-	-	-	-	809	65	-	205	5357	10221	15578
3 USC	525	-	-	219	42	-	-	-	-	410	165	-	348	1711	2927	4638
4 MFC	147	-	8	-	7	-	-	-	-	469	433	112	429	1606	5029	6635
5 D	671	-	-	-	-	18	-	-	6	294	32	-	94	1116	9402	10519
6 DC	-	-	-	-	-	-	-	-	-	-	10	-	-	10	42	52
7 RH	-	-	-	-	-	-	-	-	-	-	5	-	40	45	220	265
8 RTH	-	-	-	-	32	-	-	-	-	8	-	-	356	396	338	732
9 WAC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	58	58
10 WA	-	-	-	-	-	-	-	-	-	-	5	-	16	21	3750	3772
11 HRA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	178	178
12 V	2128	13	-	-	261	-	-	108	-	331	114	-	-	2955	-	2955
13 NR	45	-	-	5	6	-	-	-	-	84	193	-	-	332	-	332
Totals	8814	2920	750	847	2128	18	-	108	6	9705	2352	208	5012	32869	172171	204706

Source: Assessor's Department, City of Edmonton, 1970-71.





yields the total land area involved in change or succession during each period. The relative importance of each type of change is measured by expressing each cell as a percentage of this total. The marginal totals of each column and row in this matrix are the relative rates of succession of land into and out of each land use type.

### Components of Land Use Succession Processes

Several regularities are apparent in the matrices.

(1) A shift in land use is accompanied by a tendency towards an intensification of use, illustrating the general sequence of replacement economics.<sup>11</sup> This is shown by the greater frequency of entries in cells along the rows of vacant and single-family uses. It is these uses which mainly succumb to change; it is very infrequent that a higher-density use, such as a duplex or an apartment, is succeeded by a lower-density form.

(2) Certain land uses are seldom involved in change, particularly land developed initially to multi-family use. Vacancies in other cells are partially the result of the taxonomy employed. For example, it is unlikely that a single-family house could be changed to a duplex conversion in a single ten-year period.

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<sup>11</sup>See for example R. Barlowe, Land Resource Economics: The Political Economy of Rural and Urban Land Resource Use, Englewood Cliffs, Prentice-Hall, 1958, pp. 219-242.



(3) There is an increasing number of properties involved in transition in each successive period. Excluding development on vacant land, in each of the five periods there were 48, 455, 1,159, 3,875 and 5,104 land use changes. There is an apparent relationship between the increasing age of dwellings and the occurrence of transition activity: as the city ages, properties are more susceptible to yield to transition processes.

(4) As time passes, there is a greater array and complexity of changes. More land uses, especially converted types, exist in later periods, with the result that these too are likely to be involved in change, increasing the variety of transition processes.

(5) There is not, as some economists have suggested, a definite three-stage sequence of single-family development, dwelling conversion and then redevelopment on a particular parcel of land.<sup>12</sup> Many single-family houses have bypassed the conversion stage and have been directly redeveloped to new uses.

Land Use Transferred In. The origins of new land uses are summarized in proportionate form in Table 16. Each column sums to one. Because transition was minimal prior to 1941, only the three

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<sup>12</sup>See for example E. M. Fisher and R. M. Fisher, Urban Real Estate, New York, Henry Holt, 1954, pp. 338-339.



TABLE 16

LAND USE TRANSFERRED IN, 1951 BUILT-UP AREA, 1942-1971  
(DATA ARE EXPRESSED AS PROPORTIONS OF COLUMN TOTALS)

1941 Land Uses	1951 Land Uses										
	SF	BC	USC	MFC	D	DC	RH	RTH	WAC	WA	HRA
SF	.000	.449	.992	.966	.000	.000	.000	.000	.000	.011	.000
BC	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
USC	.000	.000	.000	.010	.000	.000	.000	.000	.000	.000	.000
MFC	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
D	.000	.000	.000	.000	.000	1.000	.000	.000	1.000	.000	.000
DC	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
RH	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
RTH	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
WAC	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
WA	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
HRA	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
V	1.000	.551	.008	.022	1.000	.000	1.000	1.000	.000	.978	.000
NR	.000	.000	.000	.002	.000	.000	.000	.000	.000	.011	.000
Totals	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	.000
1951 Land Uses	1961 Land Uses										
	SF	BC	USC	MFC	D	DC	RH	RTH	WAC	WA	HRA
SF	.030	.888	.998	.850	.136	.000	.000	.000	.000	.308	.304
BC	.009	.000	.000	.018	.000	.000	.000	.000	.000	.000	.000
USC	.008	.000	.000	.132	.002	.000	.000	.000	.000	.017	.073
MFC	.001	.000	.000	.000	.000	.000	.000	.000	.491	.000	.035
D	.001	.000	.000	.000	.000	1.000	.000	.000	.509	.000	.000
DC	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
RH	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
RTH	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
WAC	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
WA	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
HRA	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
V	.951	.112	.002	.000	.561	.000	.000	1.000	.000	.640	.589
NR	.000	.000	.000	.000	.001	.000	.000	.000	.000	.033	.000
Totals	1.000	1.000	1.000	1.000	1.000	1.000	.000	1.000	1.000	1.000	1.000
1961 Land Uses	1971 Land Uses										
	SF	BC	USC	MFC	D	DC	RH	RTH	WAC	WA	HRA
SF	.125	.995	.989	.636	.836	.000	.000	.000	.000	.752	.565
BC	.476	.000	.000	.099	.000	.000	.000	.000	.000	.083	.028
USC	.059	.000	.000	.259	.020	.000	.000	.000	.000	.042	.070
MFC	.017	.000	.011	.000	.003	.000	.000	.000	.000	.048	.185
D	.076	.000	.000	.000	.000	1.000	.000	.000	1.000	.030	.014
DC	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.004
RH	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.002
RTH	.000	.000	.000	.000	.015	.000	.000	.000	.000	.001	.000
WAC	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.002
WA	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
HRA	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
V	.241	.005	.000	.000	.123	.000	.000	1.000	.000	.034	.048
NR	.005	.000	.000	.055	.003	.000	.000	.000	.000	.009	.082
Totals	1.000	1.000	1.000	1.000	1.000	1.000	.000	1.000	1.000	1.000	1.000

Source: Assessor's Department, City of Edmonton, 1970-71.



periods since this date are listed. From the table several patterns emerge which illustrate more explicitly the importance of vacant and single-family land in succession processes.

(1) Initially, most residential types sought sites on vacant land, but when this reserve was exhausted, they turned to land occupied by single-family homes. For example, vacant land supplied 86 percent of the duplex development sites in the 1950s, but only 12 percent in the 1960s, when single-family houses became the more important source.

(2) Single-family houses have supplied the majority of land for converted types, although there has been a small proportion of multiple-family suites derived from two-family conversions.

(3) Single-family houses also supply most of the sites for walk-up and high rise redevelopments. High rises, though, are less discriminatory.

(4) Land acquired for single-family use during the 1960s came not from vacant land, but mainly from redevelopment (13 percent) and by the reconversion of higher-density properties (63 percent).

Land Use Transferred Out. In Table 17, land which was transferred out to succeeding uses is summarized. The following are the major trends.





TABLE 17

LAND USE TRANSFERRED OUT, 1951 BUILT-UP AREA, 1942-1971  
(DATA ARE EXPRESSED AS PROPORTIONS OF ROW TOTALS)

1941 Land Uses	1951 Land Uses														Totals
	SF	BC	USC	MFC	D	DC	RH	RTH	WAC	WA	HRA	V	NR		
SF	.000	.182	.368	.413	.000	.000	.000	.000	.000	.002	.000	.000	.035	1.000	
BC	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
USC	.146	.000	.000	.554	.000	.000	.000	.000	.000	.000	.000	.000	.000	1.000	
MFC	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
D	.000	.000	.000	.000	.201	.000	.000	.000	.799	.000	.000	.000	.000	.000	
DC	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
RH	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
RTH	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
WAC	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
WA	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
HRA	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
V	.920	.014	.001	.001	.050	.000	.000	.004	.000	.012	.000	.000	.000	1.000	
NR	.000	.000	.000	.260	.000	.000	.000	.000	.000	.740	.000	.000	.000	1.000	
1951 Land Uses	1961 Land Uses														Totals
	SF	BC	USC	MFC	D	DC	RH	RTH	WAC	WA	HRA	V	NR		
SF	.027	.603	.113	.108	.035	.000	.000	.000	.000	.030	.003	.000	.080	1.000	
BC	.762	.000	.000	.214	.000	.000	.000	.000	.000	.000	.000	.000	.025	1.000	
USC	.232	.000	.000	.525	.018	.000	.000	.000	.000	.053	.021	.000	.149	1.000	
MFC	.153	.000	.000	.000	.000	.000	.000	.000	.142	.041	.045	.000	.616	1.000	
D	.123	.000	.000	.000	.000	.371	.000	.000	.211	.000	.000	.000	.295	1.000	
DC	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
RH	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
RTH	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	1.000	1.000	
WAC	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
WA	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
HRA	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
V	.698	.062	.001	.000	.180	.000	.000	.009	.000	.052	.000	.000	.000	1.000	
NR	.031	.000	.000	.000	.000	.000	.000	.000	.000	.359	.587	.000	.000	1.000	
1961 Land Uses	1971 Land Uses														Totals
	SF	BC	USC	MFC	D	DC	RH	RTH	WAC	WA	HRA	V	NR		
SF	.057	.151	.038	.028	.092	.000	.000	.000	.000	.378	.069	.005	.182	1.000	
BC	.783	.000	.000	.016	.000	.000	.000	.000	.000	.151	.012	.000	.038	1.000	
USC	.307	.000	.000	.128	.025	.000	.000	.000	.000	.240	.096	.000	.234	1.000	
MFC	.091	.000	.005	.000	.005	.000	.000	.000	.000	.292	.270	.070	.267	1.000	
D	.601	.000	.000	.000	.000	.016	.000	.000	.005	.264	.029	.000	.084	1.000	
DC	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	1.000	.000	.000	1.000	
RH	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.111	.000	.889	1.000	
RTH	.000	.000	.000	.000	.081	.000	.000	.000	.000	.020	.000	.000	.899	1.000	
WAC	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.251	.000	.749	1.000	
WA	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	1.000	
HRA	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	1.000	
V	.720	.005	.000	.000	.088	.000	.000	.037	.000	.112	.038	.000	.000	1.000	
NR	.136	.000	.000	.014	.018	.000	.000	.000	.000	.251	.580	.000	.000	1.000	

Source: Assessor's Department, City of Edmonton, 1970-71.



(1) Prior to 1951, conversion of single-family properties was primarily to upper-storey and multiple-family dwellings, but after this date conversion to basement suites was more common.

(2) Changes involving single-family land shifted from conversion to redevelopment after 1961, as apartment construction alone accounted for 45 percent of the single-family changes.

(3) More converted properties are reconverted than redeveloped. The one exception is multiple-family land use.

Stability and Change in Land Use Succession. Although single-family residences bear the brunt of transition processes, do they also experience the highest relative rates of change? Table 18 summarizes the relative change and stability rates of the major land use types. From this table it is clear that properties which have been altered at least once are also more likely to succumb to further change. For example, during the 1960s, over 30 percent of the land devoted to basement and upper-storey suites was involved in change, compared to only 12 percent for single-family land use. Also significant are the high stability rates experienced through time by each land use type. Change has affected only a small proportion of each type in each period. Only with increased apartment redevelopment activity after 1961 did the stability rates of the different land uses decrease.



TABLE 18

STABILITY AND CHANGE IN LAND USE SUCCESSION IN THE 1951 BUILT-UP AREA, 1922-1971<sup>1</sup>

Land Use Types	1922-1931		1932-1941		1942-1951		1952-1961		1962-1971	
	Stable	Change	Stable	Change	Stable	Change	Stable	Change	Stable	Change
Single-family residences	99.5	.5	96.4	3.6	92.5	7.5	87.8	12.2	87.8	12.2
Basement conversions	-	-	-	-	100.0	-	91.2	8.8	65.6	34.4
Upper-storey conversions	100.0	-	100.0	-	96.7	3.3	79.5	20.5	63.1	36.9
Multiple-family conversions	100.0	-	100.0	-	100.0	-	96.8	3.2	75.8	24.2
Duplexes	100.0	-	98.4	1.6	96.7	3.3	98.3	1.7	89.4	10.6
Duplex conversions	-	-	-	-	100.0	-	100.0	-	80.7	19.3
Rooming houses	100.0	-	100.0	-	100.0	-	100.0	-	83.0	12.0
Row and terrace housing	100.0	-	100.0	-	100.0	-	100.0	-	46.2	53.8
Walk-up apartment conversions	-	-	-	-	-	-	100.0	-	99.4	.6
Walk-up apartments	100.0	-	100.0	-	100.0	-	99.8	.2	100.0	-
High rise apartments	-	-	-	-	-	-	-	-	100.0	-
Vacant land	87.2	12.8	89.9	10.1	21.9	78.1	10.9	89.1	-	100.0

<sup>1</sup>Data are expressed as percentages.

Source: Assessor's Department, City of Edmonton, 1970-71.





### The Sequence of Change in Transition Areas

Through the use of land use succession matrices, it is possible to produce a definitive account of the transition sequence and to test the relevance of the Hoover-Vernon model (Tables 19 and 20).<sup>13</sup> Their model includes successive but not necessarily discrete stages of single-family construction, apartment redevelopment, conversion, thinning-out and renewal. From the matrices and from Figure 32, which summarizes the major succession processes, it is obvious that this cycle has not occurred in Edmonton. Instead, a three-stage sequence comprised of single-family development, dwelling conversion and redevelopment is evident. There is little indication of a thinning-out stage, with the consequence that public renewal has not been necessary. Absence of these two stages does not mean that they are irrelevant; rather, Edmonton has yet to age to the extent that slum formation should occur. What, then, are the characteristics of Edmonton's three-stage sequence?

Stage 1 - Single-Family Development. Development on vacant land

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<sup>13</sup>Table 19 incorporates all land uses, including vacant land, which is necessary to empirically test the Hoover-Vernon model. Only transition processes are measured in Table 20, allowing a more precise interpretation of the transition sequence. The matrices are presented in proportionate form such that all cells sum to one, indicating the relative importance of each type of change in the evolutionary sequence.



TABLE 19

LAND USE SUCCESSION AND THE SEQUENCE OF CHANGE  
IN THE 1951 BUILT-UP AREA, 1942-1971  
(DATA ARE EXPRESSED AS PROPORTIONS OF THE TOTAL  
LAND AREA INVOLVED IN CHANGE)

1941 Land Uses	1951 Land Uses														Totals
	SF	BC	USC	MFC	D	DC	RH	RTH	WAC	WA	HRA	V	NR		
SF	.000	.010	.021	.024	.000	.000	.000	.000	.000	.001	.000	.000	.002	.057	
BC	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
USC	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
MFC	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
D	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
DC	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
RH	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
RTH	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
WAC	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
WA	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
HRA	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
V	.867	.013	.000	.000	.047	.000	.000	.004	.000	.010	.000	.000	.000	.943	
NR	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
Totals	.867	.023	.021	.024	.047	.000	.000	.004	.000	.011	.000	.000	.002	1.000	
1951 Land Uses	1961 Land Uses														Totals
	SF	BC	USC	MFC	D	DC	RH	RTH	WAC	WA	HRA	V	NR		
SF	.012	.263	.049	.047	.015	.000	.000	.000	.000	.013	.001	.000	.035	.435	
BC	.004	.000	.000	.001	.000	.000	.000	.000	.000	.000	.000	.000	.000	.005	
USC	.003	.000	.000	.007	.000	.000	.000	.000	.000	.001	.000	.000	.002	.014	
MFC	.001	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.002	.003	
D	.000	.000	.000	.000	.000	.001	.000	.000	.001	.000	.000	.000	.001	.002	
DC	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
RH	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
RTH	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
WAC	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
WA	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
HRA	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
V	.375	.033	.000	.000	.097	.000	.000	.005	.000	.028	.000	.000	.000	.537	
NR	.000	.000	.000	.000	.000	.000	.000	.000	.000	.001	.002	.000	.000	.004	
Totals	.395	.296	.049	.055	.112	.001	.000	.005	.001	.043	.003	.000	.039	1.000	
1961 Land Uses	1971 Land Uses														Totals
	SF	BC	USC	MFC	D	DC	RH	RTH	WAC	WA	HRA	V	NR		
SF	.034	.088	.022	.016	.054	.000	.000	.000	.000	.222	.040	.003	.107	.588	
BC	.128	.000	.000	.003	.000	.000	.000	.000	.000	.025	.002	.000	.006	.163	
USC	.016	.000	.000	.007	.001	.000	.000	.000	.000	.013	.005	.000	.011	.052	
MFC	.005	.000	.000	.000	.000	.000	.000	.000	.000	.014	.013	.003	.013	.049	
D	.020	.000	.000	.000	.000	.001	.000	.000	.000	.009	.001	.000	.003	.034	
DC	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
RH	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.001	.001	
RTH	.000	.000	.000	.000	.001	.000	.000	.000	.000	.000	.000	.000	.011	.012	
WAC	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.001	.001	
WA	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
HRA	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
V	.005	.000	.000	.000	.008	.000	.000	.003	.000	.010	.004	.000	.000	.089	
NR	.001	.000	.000	.000	.000	.000	.000	.000	.000	.003	.006	.000	.000	.010	
Totals	.268	.088	.022	.026	.065	.001	.000	.003	.000	.295	.072	.006	.153	1.000	

Source: Assessor's Department, City of Edmonton, 1970-71.



TABLE 20

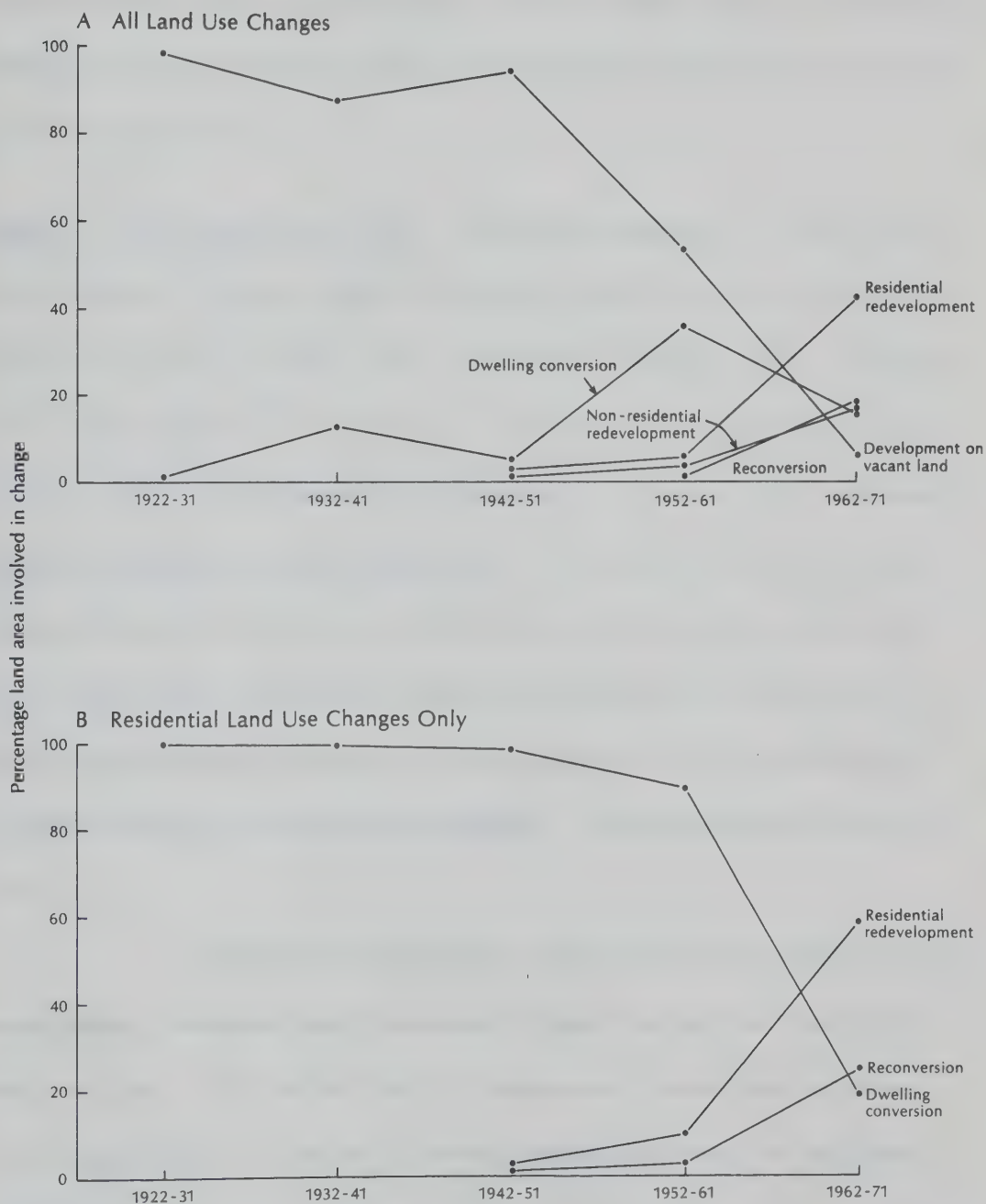
LAND USE SUCCESSION AND THE TRANSITION SEQUENCE  
IN THE 1951 BUILT-UP AREA, 1942-1971  
(DATA ARE EXPRESSED AS PROPORTIONS OF THE TOTAL  
LAND AREA INVOLVED IN CHANGE)

1941 Land Uses	1951 Land Uses											
	SF	BC	USC	MFC	D	DC	RH	RTH	WAC	WA	HRA	Totals
SF	.000	.334	.307	.350	.000	.000	.000	.000	.000	.002	.000	.992
BC	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
USC	.001	.000	.000	.004	.000	.000	.000	.000	.000	.000	.000	.004
MFC	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
D	.000	.000	.000	.000	.000	.001	.000	.000	.003	.000	.000	.004
DC	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
RH	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
RTH	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
WAC	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
WA	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
HRA	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
Totals	.001	.334	.307	.354	.000	.001	.000	.000	.003	.002	.000	1.000
1951 Land Uses	1961 Land Uses											
	SF	BC	USC	MFC	D	DC	RH	RTH	WAC	WA	HRA	Totals
SF	.026	.654	.109	.104	.034	.000	.000	.000	.000	.029	.003	.958
BC	.008	.000	.000	.002	.000	.000	.000	.000	.000	.000	.000	.010
USC	.007	.000	.000	.016	.001	.000	.000	.000	.000	.002	.001	.026
MFC	.001	.000	.000	.000	.000	.000	.000	.000	.001	.000	.000	.003
D	.001	.000	.000	.000	.000	.002	.000	.000	.001	.000	.000	.003
DC	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
RH	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
RTH	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
WAC	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
WA	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
HRA	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
Totals	.043	.654	.109	.122	.035	.002	.000	.000	.002	.031	.004	1.000
1961 Land Uses	1971 Land Uses											
	SF	BC	USC	MFC	D	DC	RH	RTH	WAC	WA	HRA	Totals
SF	.045	.120	.030	.022	.073	.000	.000	.000	.000	.299	.055	.645
BC	.172	.000	.000	.004	.000	.000	.000	.000	.000	.033	.003	.211
USC	.022	.000	.000	.009	.002	.000	.000	.000	.000	.017	.007	.056
MFC	.006	.000	.000	.000	.000	.000	.000	.000	.000	.019	.018	.044
D	.028	.000	.000	.000	.000	.001	.000	.000	.000	.012	.001	.042
DC	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
RH	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
RTH	.000	.000	.000	.000	.001	.000	.000	.000	.000	.000	.000	.002
WAC	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
WA	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
HRA	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
Totals	.272	.120	.030	.035	.076	.001	.000	.000	.000	.381	.084	1.000

Source: Assessor's Department, City of Edmonton, 1970-71.



Figure 32  
SEQUENCE OF CHANGE  
IN THE 1951 BUILT-UP AREA



Source: Assessor's Department, City of Edmonton, 1970-71





was still the dominant form of change even as late as the 1950s.

Single-family housing was clearly the norm, totalling over 80 per cent of the land use changes in each period (Figure 32). Multi-family construction was minimal. By the 1960s, however, development on vacant land had ceased, and transition processes assumed primary importance.

Stage 2 - Dwelling Conversion. The first instances of conversion were limited. No more than 15 percent of the land use changes in each period prior to 1951 were conversions (Figure 32). As shown by the map analysis in Chapter III, conversion was initially concentrated in older areas near the central core. Thus, while new single-family development was occurring at an accelerating pace on the fringe of the city, conversion activities were becoming characteristic in the inner-city neighbourhoods, creating the next stage in their sequential development. In fact, prior to 1941 conversion accounted for all the transition changes. Redevelopment had yet to occur.

Initial transition was comprised almost entirely of the conversion of single-family houses to upper-storey and multiple-family suites. Only after 1941 did basement conversions assume more importance. Few multi-family buildings, such as duplexes, apartments, and row and terrace units, were affected by conversion.



Some two-family conversions, though, were adapted to greater-density use. Conversion reached its peak of activity during the 1950s when it accounted for 36 percent of all the land use changes (Table 19) and nearly 90 percent of the transition changes (Table 20). By 1961 the time lag between initial single-family construction and the occurrence of change had been reduced. This is best illustrated by the 1942-1951 matrix (Table 19), in which a number of basement conversions were derived directly from vacant sites. Before this ten-year period had expired, newly constructed houses had been converted. This rapid conversion was the result of the heavy post-war housing demand which existed in Edmonton.<sup>14</sup>

Stage 3 - Apartment Redevelopment. After 1961, transition activity shifted sharply from conversion to redevelopment, as apartment construction in previously converted areas formed the next stage in the transition sequence. Walk-ups and high rises now accounted for more than 45 percent of the transition changes, with conversion declining to less than 20 percent. Reconversion (23 percent) emerged as an important complement to redevelopment activity (Table 20). Although higher replacement rates were shown by

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<sup>14</sup>City of Edmonton, Planning Department, Outline History of Illegal Suites, 1968, 8 pp. (Mimeographed)



converted types, redevelopment was directed primarily at single-family houses. Apartments, however, were located in only a few parts of the city, with the result that most neighbourhoods remained in the conversion stage. Yet, redevelopment was apparently strong enough to limit new conversion and to reduce residential transition throughout the rest of the 1951 built-up area.

### SUMMARY

That neighbourhoods evolve through a succession of stages has been recognized for some time, but the first real attempt to conceptualize this sequence was made less than fifteen years ago by Hoover and Vernon. However, their model is inappropriate to describe the transition sequence which has emerged in the 1951 built-up area of Edmonton. The Edmonton data show that conversion has preceded redevelopment, and that apartments replace both single-family and converted properties. Moreover, few multi-family structures have been converted as Hoover and Vernon suggested.

The sequence outlined in this chapter, which includes successive phases of single-family construction, dwelling conversion and redevelopment, generally meets the stage model requirements discussed in the introductory chapter. Following Kuznets' guidelines, (1) the characteristics of each stage are unique to that stage





alone and (2) the relationship of each stage to its preceding or succeeding stage, through the identification of the formative processes (conversion and redevelopment) is well defined.<sup>15</sup> Kuznets also emphasized that each stage should display empirically testable characteristics. Although the amount of conversion and redevelopment has been measured, it is also necessary to identify the characteristics of converted and redeveloped properties, to differentiate changed from unchanged properties, and to specify the order in which different types of properties succumb to change during the transition sequence. These facets will be examined in the next two chapters in which conversion and redevelopment processes are discussed.

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<sup>15</sup>S. Kuznets, Economic Growth and Structure, New York, Norton, 1965, pp. 213-216.



## Chapter V

THE DWELLING CONVERSION PROCESS  
IN TRANSITION AREAS

The conversion of residential structures, by the addition of one or more dwelling units, is basic to the total process of residential change. In particular, conversion is usually the first indicator that an area is entering the transitional phase of its sequential development. Various factors, both external and endogenous to the neighbourhood, cause conversion. The most obvious yet important is the demand for rental accommodation, which has been partially created by the inability of the housing market to produce reasonable alternative forms of housing.<sup>1</sup> The filtering process is also a determinant.<sup>2</sup>

A specific geographic problem, which is directly related to interpreting the changing morphology of transition areas, is to identify those factors which attract conversion to an area and

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<sup>1</sup>See for example G. H. Beyer, Housing and Society, New York, Macmillan, 1965, pp. 117-148; and F. G. Mittelbach, The Changing Housing Inventory: 1950-1959, Research Report No. 4, Real Estate Research Program, Los Angeles, University of California Press, 1963, p. 7.

<sup>2</sup>See for example W. F. Smith, Filtering and Neighbourhood Change, Research Report No. 24, Centre for Real Estate and Urban Economics, Berkeley, University of California Press, 1964, 79 pp.



those which determine the different forms of conversion. Are there, then, characteristics of an area's morphology which are particularly associated with conversion activity? This chapter is thus concerned with the ways in which housing characteristics have influenced the spatial development of the conversion pattern and the occurrence of different conversion forms. The order in which different houses succumb to conversion is also examined.

## RESIDENTIAL MORPHOLOGY AND THE DWELLING CONVERSION PROCESS

The relationship between morphology and the conversion process, although often cited in the literature, has seldom been empirically tested. The housing characteristics frequently associated with conversion include the age of dwellings, their size, structural type and condition, as well as ownership status. Conversion is usually assigned to those areas of the city characterized by an aging housing stock. Hoover and Vernon, for example, observe that "... the units involved in conversion were in comparatively old structures."<sup>3</sup> Muth supports this position, although indirectly: "... newer dwellings and single-family houses on larger lots would

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<sup>3</sup>E. M. Hoover and R. Vernon, Anatomy of a Metropolis, New York, Doubleday, 1959, p. 189.



be more costly to convert."<sup>4</sup> House types and the closely related variable of size are given prominence: "the very size of many of the villas virtually rules out their continuance as single-family dwellings and a process of subdivision and conversion is well-nigh ubiquitous."<sup>5</sup> Aspects related to construction quality, condition and obsolescence are also believed to induce conversion.<sup>6</sup> There are two interpretations of the role of homeownership which are related to filtering. One links conversion to lower-income groups who, in order to purchase their homes, may find it necessary to share some of their accommodation. Conversion is also associated with absentee owners who realize a greater profit by subdividing their houses.<sup>7</sup>

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<sup>4</sup>R. F. Muth, Cities and Housing, Chicago, University of Chicago Press, 1969, p. 134.

<sup>5</sup>D. W. G. Timms, The Urban Mosaic, Cambridge, University of Cambridge Press, 1971, p. 28. See also H. Hoyt, The Structure and Growth of Residential Neighbourhoods in American Cities, Washington, United States Government Printing Office, 1939, p. 84; R. J. Johnston, Urban Residential Patterns, London, G. Bell, 1971, p. 102; D. Ward, Cities and Immigrants, New York, Oxford University Press, 1971, p. 108; and A. B. Wolfe, The Lodging House Problem in Boston, Cambridge, Harvard University Press, 1913, pp. 34-37.

<sup>6</sup>See for example J. S. Adams, "Residential Structure of Mid-western Cities," Annals, Association of American Geographers, vol. 60, 1970, p. 61; and J. E. Rickert, "House Facades of the Northeastern United States: A Tool of Geographic Analysis," Annals, Association of American Geographers, vol. 57, 1967, p. 215.

<sup>7</sup>Johnston, op. cit., pp. 102-103.





These housing variables, though, have not been subjected to a careful appraisal. For example, there is little evidence to suggest the length of time which elapses between initial construction and eventual conversion. There is only the assertion that conversion is common to older houses. Yet, does this generalization apply to all converted types? Conversion is also ascribed to larger houses, but it is never specified if particular house types are more susceptible to change than others, or if they determine the specific form of conversion. Nor is there information about the sequence in which particular houses yield to conversion. It can be concluded, then, that few specifics have been recorded.

## HOUSING CORRELATES OF THE DWELLING CONVERSION PROCESS

### Measurement of Areal and Site Correlates

The effect of morphology on conversion was tested at two complementary levels. To measure spatial relationships at the enumeration area level, simple correlation analyses were programmed between selected housing characteristics and each of the converted types (multiple-family, upper-storey and basement conversions). The purpose was to reveal those physical qualities which attract conversion to an area and therefore to evaluate the assertions reviewed in the previous section. The housing variables, derived



mainly from the sampled assessment data, were grouped under age and period of construction, land parcel and house size, original construction quality and present condition, and house types. Distance variables were included to interpret the locational features of the distribution pattern.<sup>8</sup> Only enumeration areas in which each conversion type is present were included in a correlation analysis.

Multiple-family conversions are found in 183 enumeration areas (Figure 33), upper-storey conversions in 169 areas (Figure 34), and basement conversions in 289 areas (Figure 35). When necessary, data were transformed to approximate normal distributions (Table 21).

The second stage was the analysis of the site characteristics of conversions, again according to various physical qualities such as age and structural type. Ownership status was also taken into consideration. The intent was to ascertain how conversions differ from each other and from non-converted properties. To do so, frequency tables were compiled to demonstrate the distribution of the housing characteristics among the land use types. Because the data were sampled and were in nominal form, with

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<sup>8</sup>These include straight line distance to the central business district, the University of Alberta and the nearest major business or institutional centre (Strathcona, Jasper Place or the Northern Alberta Institute of Technology).



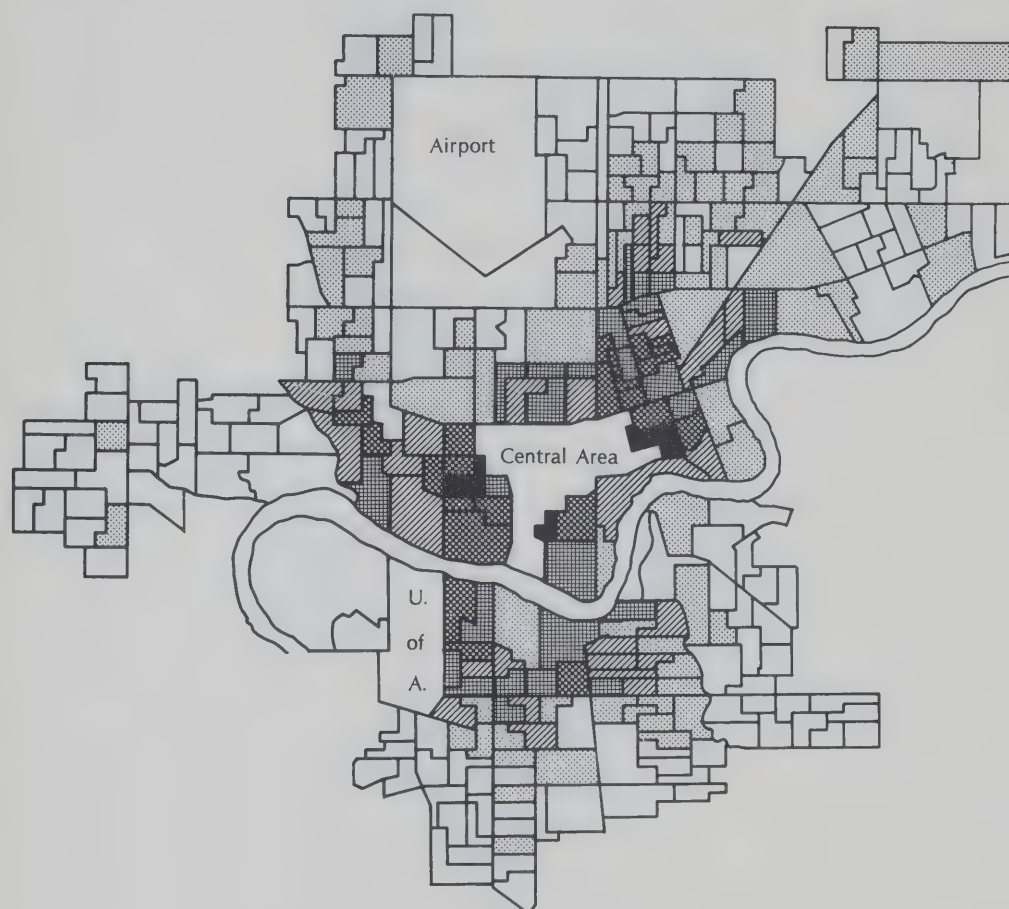
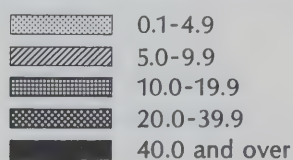


Figure 33

## SPATIAL FRAMEWORK FOR CORRELATION ANALYSIS

Distribution of Multiple Family Converted Dwellings, 1961

## Percentage of Houses Converted



0 0.5 1 Mile

Source: Assessor's Department, City of Edmonton, 1970-71





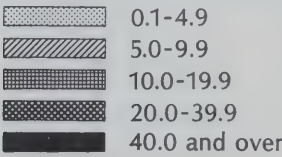


Figure 34

SPATIAL FRAMEWORK FOR CORRELATION ANALYSIS

Distribution of Upper-Storey Converted Dwellings, 1961

Percentage of Houses Converted



0 0.5 1 Mile

Source: Assessor's Department, City of Edmonton, 1970-71



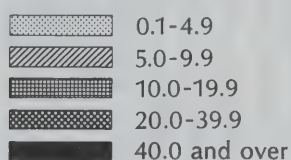


Figure 35

## SPATIAL FRAMEWORK FOR CORRELATION ANALYSIS

Distribution of Basement Converted Dwellings, 1961

## Percentage of Houses Converted



0 0.5 1 Mile

Source: Assessor's Department, City of Edmonton, 1970-71



TABLE 21  
HOUSING VARIABLES USED IN THE CORRELATION ANALYSIS

Variable Description	Data Source <sup>1</sup>	Transformation for Conversion Analyses <sup>2</sup>			
		MFC	USC	BC	All
Percentage of houses, multiple-family conversions	A	L	L	L	L
Percentage of houses, upper-storey conversions	A	L	L	L	L
Percentage of houses, basement conversions	A	L	L	L	L
Percentage of houses, conversions	A	L	L	L	L
Average age of houses	A	L	L	L	L
Percentage of houses, built prior to 1920	A	S	S	SR	SR
Percentage of houses, built 1920-1929	A	L	L	L	L
Percentage of houses, built 1930-1939	A	L	L	L	L
Percentage of houses, built 1940-1949	A	L	L	SR	SR
Percentage of houses, built after 1949	A	L	L	L	L
Average parcel area	A	SR	SR	SR	SR
Average ground floor area of houses	A	SR	SR	SR	SR
Average number of rooms in houses	A	SR	SR	SR	SR
Percentage of houses, cottages	A	L	L	SR	SR
Percentage of houses, bungalows	A	L	L	SR	SR
Percentage of houses, one-and-a-half storey	A	L	L	L	L
Percentage of houses, one-and-three quarter storey	A	SR	SR	L	L
Percentage of houses, two storey	A	SR	SR	L	L
Percentage of houses, three storey	A	L	L	L	L





TABLE 21 (CONTINUED)

Variable Description	Data Source <sup>1</sup>	Transformation for Conversion Analyses <sup>2</sup>			
		MFC	USC	BC	All
Percentage of houses, good quality construction	A	L	L	L	L
Percentage of houses, fair quality construction	A			S	S
Percentage of houses, poor quality construction	A	L	L	L	L
Percentage of dwelling units, good condition	C	S	S	S	S
Percentage of dwelling units, need minor repairs	C	L	L	L	L
Percentage of dwelling units, need major repairs	C	L	L	L	L
Distance to central business district					
Distance to University of Alberta					
Distance to nearest business or institutional centre					

<sup>1</sup>Data were obtained from either the Assessor's Department (A) or the 1961 Census of Canada (C). The conversion variables were based on complete data coverage, while all other housing variables were derived from the 20 percent housing sample.

<sup>2</sup>L indicates a logarithmic (base 10) transformation; SR a square root transformation; and S a squared transformation.





frequencies reported in discrete categories, the chi-square test was used to determine the significance of differences among the k independent groups.<sup>9</sup> As an extension of this test, the contingency coefficient (C) was calculated to measure the extent of association between the housing characteristics and the land use categories. The analysis was applied to the entire 1951 built-up area.

### Areal Correlates of Conversion

The most frequent claim, that conversion is associated with the older districts of a city, is clearly supported by the Edmonton data (Table 22). All conversions, when grouped together, are significantly and positively associated with average housing age ( $r = .629$ ) and notably with areas in which much of the housing was constructed prior to 1920 ( $r = .610$ ). Conversely, conversion occurs in only limited amounts in areas built up in the 1940s ( $r = -.298$ ) and since 1949 ( $r = -.546$ ). Because housing is oldest near the central core, these values imply that a relationship will exist between the occurrence of conversion and the distance to this centre. Indeed, conversion does diminish in intensity with increased distance from the central business district ( $r = -.610$ ). Accessibility to other

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<sup>9</sup>S. Siegel, Nonparametric Statistics, New York, Wiley, 1956, pp. 175-179.



TABLE 22

SPATIAL ASSOCIATION BETWEEN CONVERTED DWELLINGS  
AND SELECTED HOUSING CHARACTERISTICS FOR  
ENUMERATION AREAS IN THE 1951 BUILT-UP AREA, 1961  
(SIMPLE CORRELATION COEFFICIENTS)

Housing Characteristics	MFC	USC	BC	All
Average age	.699***	.679***	-.111*	.629***
Built prior to 1920	.696***	.617***	-.130**	.610***
Built 1920 to 1929	.143*	.067	.041	.390***
Built 1930 to 1939	-.212**	-.155*	.024	-.001
Built 1940 to 1949	-.601***	-.444***	.237***	-.298***
Built after 1949	-.594***	-.462***	.089	-.546***
Average parcel area	-.325***	-.303***	-.055	-.445***
Average floor area	.415***	.290***	-.112*	.099
Average rooms	.773***	.473***	-.059	.541***
Cottages	-.471***	-.369***	.030	-.246***
Bungalows	-.413***	-.267***	.395***	-.075
1 1/2 storey houses	-.133*	-.077	.113*	-.052
1 3/4 storey houses	.386***	.456***	-.136**	.423***
Two storey houses	.716***	.573***	-.094	.561***
Three storey houses	.449***	.229***	-.246*	.325***
Good construction	-.114	-.050	.154**	.047
Fair construction	.215**	.120	.118*	.202***
Poor construction	-.155**	-.071	-.142**	-.120*
Good condition	-.258***	-.105	.027	-.223***
Need minor repairs	.219**	.108	.031	.227***
Need major repairs	.212**	.055	-.115*	.118*
Distance to C.B.D.	-.650***	-.528***	-.023	-.610***
Distance to U. of A.	-.461***	-.258***	.009	-.229***
Distance to centre	-.028	-.005	-.134	-.050
	N = 183	N = 169	N = 289	N = 289

\*\*\*Significant at .001 level; \*\*Significant at .01 level; \*Significant at .05 level.

Source: Calculated by author.



centres, as measured by straight line distance, is less important, although the proximity of multiple-family conversions to the University of Alberta provides an exception ( $r = -.461$ ). Many of the rental units in these houses are occupied by university students.<sup>10</sup>

Variations exist between the age variables and the converted types. Upper-storey and multiple suites are found in the oldest areas and thus correlate with each other ( $r = .630$ ), but basement conversions are not associated with areas developed during any particular period. Based on the map analyses in Chapter III, it was anticipated that this group would correlate strongly with housing built in the 1940s, but the relationship is only of marginal strength ( $r = .237$ ). The regression residuals show that it is weak because many areas which are comprised almost entirely of post-1940 development have only limited numbers of basement suites, while areas of mixed development have greater numbers.

House types have a substantial influence on the form of conversion which will be found in particular transition areas. For example, the correlation between multiple-family conversions and two storey buildings is  $r = .716$ . This house type is also associated with upper-storey suites ( $r = .573$ ), while basement conversions

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<sup>10</sup>R. F. Windsor, "The Campus Fringe of the University of Alberta," unpublished M.A. thesis, Edmonton, 1964, 133 pp.





correlate moderately with bungalows ( $r = .395$ ). On the other hand, areas with cottages and one-and-a-half storey dwellings do not attract conversion.

House sizes are closely related to these structural forms. For example, the correlation coefficient between average number of rooms and two storey houses is  $r = .721$ . Multiple suites, then, correlate most strongly with average rooms ( $r = .773$ ), whereas upper-storey conversions ( $r = .473$ ) and basement suites ( $r = -.059$ ) show weaker relationships.

Because it is conventional to associate conversion with deterioration, the condition of buildings, both at the time of construction and now, provides another important group of variables. However, there is little evidence in the Edmonton data to support this generalization. Conversion tends to be associated with areas of fair original construction ( $r = .202$ ) now having housing in need of minor repairs ( $r = .227$ ), but these results are hardly conclusive. Conversion areas with housing in poor condition do exist (for example, immediately northeast of the central business district), but these are apparently concealed in the total pattern.<sup>11</sup>

At the areal level, then, conversion is clearly

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<sup>11</sup>City of Edmonton, Planning Department, Urban Renewal Study, 1964, 34 pp.



associated with the older parts of Edmonton, but has yet to establish itself in the more recently developed districts. Conversions are particularly concentrated in pre-1920 housing areas. These same areas contain many one-and-three-quarter storey and two storey houses, with which upper-storey and multiple-family suites are related. Post-1940 areas of bungalow development, although comprising lesser proportions of converted dwellings, have attracted the basement suite class. The spread of the different converted types throughout the city is therefore governed largely by the distribution of the various house types. Original construction quality and present condition, in contrast, have had little effect on the spatial pattern. Conversion occurs equally in both good and poor quality areas.

### Site Correlates of Conversion

House Types. There is a direct relationship between class of conversion and house types, which is indicated by the contingency coefficient of  $C_u = .64$  (Table 23).<sup>12</sup> In addition, each converted

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<sup>12</sup>The size of the contingency coefficient is a function of the number of cells in the frequency tables, and under no circumstances is it possible for the coefficient to be unity, even though a perfect relationship may exist. For example, in a two-by-two table the maximum value is .707. However, a correction for unity can be achieved by dividing the contingency coefficient by the maximum value, yielding  $C_u$ . See Siegel, op. cit., pp. 196-202.



TABLE 23

HOUSE TYPES AND SITE CHARACTERISTICS  
OF CONVERTED DWELLINGS IN THE 1951 BUILT-UP AREA, 1961  
(BY NUMBER AND PERCENTAGE OF HOUSES<sup>1</sup>)

House Types	MFC	USC	BC	SF	Totals
Cottages	2 (.1)	5 (.3)	84 (4.5)	1,780 (95.1)	1,871 (100.0)
Bungalows	5 (.3)	6 (.3)	382 (18.4)	1,680 (81.0)	2,073 (100.0)
1 1/2 storey	37 (2.9)	50 (3.9)	106 (8.4)	1,074 (84.8)	1,267 (100.0)
1 3/4 storey	39 (11.0)	47 (13.2)	2 (.6)	267 (75.2)	355 (100.0)
Two storey	187 (28.1)	94 (14.1)	15 (2.3)	369 (55.5)	665 (100.0)
Three storey	41 (66.1)	4 (6.5)	-	17 (27.4)	62 (100.0)
Totals	311	206	589	5,271	6,293 <sup>2</sup>
Chi-square = 2111.3; df = 12; C = .52; Cu = .64; S = .001.					

<sup>1</sup>Data in brackets are percentages of the row totals.

<sup>2</sup>Excludes 52 shacks and 32 split-level single-family dwellings.

Source: Twenty percent housing sample, Assessor's Department, City of Edmonton, 1970-71.



type is significantly differentiated from each other and from houses remaining in single-family use.<sup>13</sup> Basement conversions are comprised mainly of cottages and bungalows (70 percent), while multiple units are accommodated in two and three storey houses (73 percent). Upper-storey conversions, on the other hand, are less discriminatory. Houses remaining in single-family use are typically smaller cottages and bungalows (Table 23).

It is also apparent that some house types are more susceptible than others to change. Their presence in an area will increase the likelihood of transition. In particular, nearly half of the two storey and over 70 percent of the three storey houses have been subdivided to suites. Because of their size and layout, they are more amenable to conversion. One-and-a-half storey and one-and-three-quarter storey dwellings, in contrast, provide less space and, if converted, they are more likely to be adapted to two-family use. In a similar way, bungalows and cottages are generally unsuited to conversion on the main-floor level, but often have direct access to the basement from one of their entrances. At the same time, cottages tend to be older than bungalows, as well as being

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<sup>13</sup>In this and the following tables, the chi-square values were found to be statistically significant at the .001 level, thus enabling the rejection in each test of the null hypothesis of no differences between the housing characteristics and the land use types.





smaller, and are less likely to have basements acceptable for conversion. As evidence, only 5 percent of the cottages in the 1951 built-up area have been converted, although they comprise nearly 30 percent of the total houses (Table 23).

House Size. This variable is so closely related to structural types that it is difficult to differentiate their effects clearly. For example, two storey dwellings are likely to have more rooms than the other house types. Nevertheless, size is important in the conversion process. It affects the house's probability and intensity of conversion. Thus, just over 75 percent of the houses with eleven rooms or more have been altered to suites, almost entirely to multiple-family units (Table 24). Furthermore, as the size of the house decreases, the conversion rate declines. The selection of houses for conversion included only 40 percent in the eight to ten room category and less than 10 percent in the less than eight room group.

House Age. The relationship between house type and conversion type is also an age relationship. Thus, 85 percent of the dwellings with basement conversions were built after 1940, while over 75 percent of the dwellings with upper-storey and multiple suites were built before 1920 (Table 25). All this means is that the change to the bungalow house style, which became almost complete in the 1940s,



TABLE 24

HOUSE SIZE AND SITE CHARACTERISTICS  
OF CONVERTED DWELLINGS IN THE 1951 BUILT-UP AREA, 1961  
(BY NUMBER AND PERCENTAGE OF HOUSES<sup>1</sup>)

Number of Rooms	MFC	USC	BC	SF	Totals
7 and under	31 ( .7)	64 (1.3)	301 ( 6.2)	4,435 (91.8)	4,831 (100.0)
8 to 10	115 ( 9.2)	119 (9.3)	270 (21.1)	772 (60.5)	1,276 (20.1)
11 and over	165 (61.1)	23 (8.5)	18 ( 6.7)	64 (23.7)	270 (100.0)
Totals	311	100.0	206	100.0	589
Average area	1,020.5	861.2	872.0	814.5	853.0
Average rooms	11.3	8.4	7.7	5.9	6.4

Chi-square = 2681.4; df = 6; C = .54; Cu = .66; S = .001.

<sup>1</sup> Data in brackets are percentages of the row totals.

Source: Twenty percent housing sample, Assessor's Department, City of Edmonton, 1970-71.



TABLE 25

HOUSING AGE AND SITE CHARACTERISTICS  
OF CONVERTED DWELLINGS IN THE 1951 BUILT-UP AREA, 1961  
(BY NUMBER AND PERCENTAGE OF HOUSES<sup>1</sup>)

Construction Period	MFC	USC	BC	SF	Totals
Prior to 1920	245 (15.6)	155 (9.9)	31 (2.0)	1,137 (72.5)	1,568 (100.0)
1920 to 1929	42 (5.9)	32 (4.5)	28 (3.9)	607 (85.6)	709 (100.0)
1930 to 1939	9 (2.0)	7 (1.6)	23 (5.3)	398 (91.1)	437 (100.0)
1940 to 1949	14 (15.2)	10 (.4)	355 (.6)	1,958 (83.8)	2,337 (100.0)
After 1949	1 (.1)	2 (.2)	152 (11.4)	1,171 (88.3)	1,326 (100.0)
Totals	311	206	589	5,271	6,377
Average age	44.6	44.1	16.5	24.1	33.8
Chi-square = 1093.1; df = 12; C = .38; Cu = .49; S = .001.					

<sup>1</sup>Data in brackets are percentages of the row totals.

Source: Twenty percent housing sample, Assessor's Department, City of Edmonton, 1970-71.





made a different form of conversion possible. Older houses generally lack full and high ceilinged basements, making their basement areas restricted for additional living space. Conversely, newer houses (primarily one storey structures) are not easily adapted to multiple use.

Although there is a tendency for a higher proportion of older than newer houses to be converted, many houses, even of the oldest classes, have not been converted. For instance, only 28 percent of the houses built prior to 1920 and 18 percent of those constructed in the 1940s have been converted (Table 25). The conversion rates are considerably smaller for the other building periods. These figures indicate that the structural form of the dwelling, rather than its age, is more significant for conversion activity. This conclusion is supported by data on the age at which dwellings are actually converted (Table 26). When converted, nearly 90 percent of the basement suites were under 20 years, while the other forms of conversion were usually under 40 years.

House Quality. The correlation analyses indicated that housing quality has little effect on the spatial occurrence of conversion.

This finding is confirmed at the site level. The percentage distribution of construction grades is essentially similar whether the dwellings are in converted or in single-family use, resulting in a low



TABLE 26

AGE OF DWELLINGS WHEN CONVERTED  
IN THE 1951 BUILT-UP AREA  
(BY NUMBER AND PERCENTAGE OF HOUSES)

Age Groups	Multiple-Family Conversions		Upper-Storey Conversions		Basement Conversions	
Less than 20 years	31	10.0	27	13.1	519	88.1
20 to 40	202	64.9	104	50.5	52	8.8
More than 40 years	78	25.1	75	36.4	18	3.1
Totals	311	100.0	206	100.0	589	100.0

Chi-square = 109.4; df = 4; C = .28; Cu = .34; S = .001.

Source: Twenty percent housing sample, Assessor's Department, City of Edmonton, 1970-71.

contingency value of Cu = .16 (Table 27). There is a slight tendency for basement suites to be in better constructed homes, but only because this land use type is common to post-1940 housing, which is generally better constructed than earlier buildings. There is also a tendency for poorer quality homes to remain in single-family use because they are frequently smaller and lack facilities, and therefore are generally less suitable for conversion.

Although a survey of the present condition of dwellings was not undertaken for this study, previous research showed



TABLE 27

QUALITY OF HOUSE CONSTRUCTION AND SITE CHARACTERISTICS  
OF CONVERTED DWELLINGS IN THE 1951 BUILT-UP AREA, 1961  
(BY NUMBER AND PERCENTAGE OF HOUSES<sup>1</sup>)

Construction Quality	MFC	USC	BC	SF	Totals
Good construction	54 17.3 (4.6)	22 10.7 (1.9)	144 24.5 (12.4)	944 17.9 (81.1)	1,164 18.2 (100.0)
Fair construction	222 71.4 (5.7)	156 35.7 (3.9)	395 67.0 (10.1)	3,148 59.7 (80.3)	3,921 61.5 (100.0)
Poor construction	35 11.3 (2.7)	28 13.6 (2.2)	50 9.5 (3.9)	1,179 22.4 (91.2)	1,292 20.3 (100.0)
Totals	311	206	589	5,271	6,377
Chi-square = 105.4; df = 6; C = .13; Cu = .16; S = .001.					

<sup>1</sup>Data in brackets are percentages of the row totals.

Source: Twenty percent housing sample, Assessor's Department, City of Edmonton, 1970-71.



that single-family houses were in poorer condition than conversions.<sup>14</sup> The discrepancy was not large, but deteriorating condition apparently is not a stimulus for, or result of, conversion—at least not in Edmonton. The generally good condition of the city's housing stock (less than 5 percent was in need of major repairs in 1961<sup>15</sup>) can be explained largely by its youthfulness. About 75 percent of the houses built to date in the study area are less than 50 years old. Because the average life expectancy of a wood-framed house in Edmonton is 60 years (although the rate of decay varies considerably according to the original quality of the building and amount of maintenance), the majority of dwellings, regardless of land use status, have yet to age to the stage where deterioration will be widespread.

Ownership Status. Because conversion is a primary source of rental accommodation, it is commonly associated solely with renter-occupancy, both at the neighbourhood and the site level. Yet this generalization can be misleading. For example, the areal

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<sup>14</sup>Nearly 15 percent of the single-family dwellings were in poor condition compared to about 9 percent of the converted types. L. D. McCann, "Processes of Change in Residential Areas in Transition," unpublished M.A. thesis, University of Alberta, 1969, p. 81.

<sup>15</sup>Canada, Dominion Bureau of Statistics, Population and Housing Characteristics by Census Tracts, Edmonton, 1961, Ottawa, Queen's Printer, 1963, p. 8.





correlation between all conversions and owner-occupied houses is  $r = -.696$  and between all conversions and renter-occupied houses it is  $r = .323$ . These are expected relationships. In addition, conversion is quite strongly related with houses jointly occupied by owner and renters ( $r = .665$ ).<sup>16</sup> This particular relationship is important for interpreting the conversion process. It implies that conversion is associated with the filtering-down of the housing stock, during which lower-economic groups may be under greater pressure to rent some of their accommodation to help pay off a mortgage or to supplement their incomes. In fact, these particular reasons were commonly reported during interviews with the owners of converted dwellings.

To determine the relationship between ownership change and resulting conversion, Table 28 was prepared. In those cases for which accurate information could be obtained, a majority had been converted within one or two years of a change in ownership. Moreover, conversion is associated with owner-occupancy and not absentee ownership (Table 29). This evidence supports the supposition that when lower-income groups enter a neighbourhood, the

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<sup>16</sup>This particular relationship could never be determined from census data because this source reports occupancy by owner or renter tenancy only. The correlation coefficients were derived from analysis of the 289 enumeration area data set.



TABLE 28

OWNERSHIP CHANGE AND CONVERSION  
IN THE 1951 BUILT-UP AREA  
(BY NUMBER AND PERCENTAGE OF HOUSES)

Ownership Change and Conversion	Multiple- Family Conversions		Upper- Storey Conversions		Basement Conversions	
Relationship <sup>1</sup>	59	59.0	62	58.5	220	52.1
No relationship	41	41.0	44	41.5	239	47.9
Totals	100	100.0	106	100.0	459	100.0

Chi-square = 6.7; df = 2; C = .10; Cu = .13; S = .01.

<sup>1</sup>Conversion occurred within two years of ownership change.

Source: Twenty percent housing sample, Assessor's Department, City of Edmonton, 1970-71.

TABLE 29

OCCUPANCY STATUS AND CONVERSION  
IN THE 1951 BUILT-UP AREA  
(BY NUMBER AND PERCENTAGE OF HOUSES)

Occupancy Status	Multiple- Family Conversions		Upper- Storey Conversions		Basement Conversions	
Owner resident	72	72.0	72	67.8	366	79.7
Owner absent	28	28.0	34	32.2	93	20.3
Totals	100	100.0	106	100.0	459	100.0

Chi-square = 8.2; df = 2; C = .11; Cu = .14; S = .01.

Source: Twenty percent housing sample, Assessor's Department, City of Edmonton, 1970-71.



chances of conversion occurring are considerably enhanced.<sup>17</sup>

### Site Selection and Conversion Through Time

Information about the dynamics of site selection is essential for interpreting the stage development of transition areas. What types of houses are converted in the initial or in the later phases of the transition sequence? Are there, then, temporal consistencies? To provide answers, the housing characteristics of converted dwellings were grouped by period of conversion (Tables 30-32). Several regularities are apparent.

(1) Upper-storey and multiple-family conversion has always been directed at the oldest buildings, mainly because older houses are typically of that style which is most easily adapted to these uses. In each period, then, over 70 percent of the houses selected for these land uses were built prior to 1920 (Tables 30 and 31). Basement conversions, though, have shifted to more recently constructed houses in each successive period (Table 32).

(2) Bungalows have always been sought for basement conversion, just as multiple suites have been consistently placed in two

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<sup>17</sup>It was further found that conversions and non-conversions have each had similar numbers of owners. Less than 10 percent of each land use type have had more than four owners between 1952 and 1971. This would indicate that frequency of ownership change, at either the neighbourhood or site level, is not a spur to conversion.





TABLE 30

SITE SELECTION AND MULTIPLE-FAMILY CONVERSION  
THROUGH TIME IN THE 1951 BUILT-UP AREA  
(BY NUMBER AND PERCENTAGE OF HOUSES)

Housing Characteristics	Prior to 1942		1942 to 1951		1952 to 1961	
Built prior to 1920	72	88.8	89	74.2	84	76.4
Built 1920 to 1929	7	8.6	20	16.7	15	13.6
Built 1930 to 1939	2	2.6	6	5.0	1	.9
Built 1940 to 1949	-	-	5	4.2	9	8.2
Built after 1949	-	-	-	-	1	.9
Cottages	-	-	1	.8	1	.9
Bungalows	-	-	1	.8	4	3.6
1 1/2 storey houses	8	9.9	17	14.2	12	10.9
1 3/4 storey houses	6	7.4	15	12.5	18	16.4
Two storey houses	42	51.9	75	62.5	70	63.6
Three storey houses	25	30.9	11	9.2	5	4.5
Good quality construction	16	19.8	24	20.0	14	12.7
Fair quality construction	58	71.6	85	70.8	79	71.8
Poor quality construction	7	8.6	11	9.2	17	15.5
Average floor area	1164.8		989.2		948.5	
Average rooms	13.8		11.3		9.5	
Total houses	81		120		110	

Source: Twenty percent housing sample, Assessor's Department, City of Edmonton, 1970-71.



TABLE 31

SITE SELECTION AND UPPER-STOREY CONVERSION  
THROUGH TIME IN THE 1951 BUILT-UP AREA  
(BY NUMBER AND PERCENTAGE OF HOUSES)

Housing Characteristics	Prior to 1942		1942 to 1951		1952 to 1961	
Built prior to 1920	19	73.0	56	79.4	82	73.2
Built 1920 to 1929	7	26.9	9	13.2	16	14.3
Built 1930 to 1939	-	-	3	4.5	4	3.6
Built 1940 to 1949	-	-	2	2.9	8	7.1
Built after 1949	-	-	-	-	2	1.8
Cottages	1	3.8	2	2.9	2	1.8
Bungalows	1	3.8	1	1.5	4	3.6
1 1/2 storey houses	8	30.8	19	27.9	23	20.5
1 3/4 storey houses	7	26.9	17	25.0	23	20.5
Two storey houses	8	30.8	28	41.2	58	51.8
Three storey houses	1	3.8	1	1.5	2	1.8
Good quality construction	4	15.4	4	5.9	14	12.5
Fair quality construction	19	73.1	56	82.4	81	72.3
Poor quality construction	3	15.4	8	11.8	17	15.2
Average floor area	890.8		848.6		861.9	
Average rooms	8.7		8.5		8.3	
Total houses	26		68		112	

Source: Twenty percent housing sample, Assessor's Department, City of Edmonton, 1970-71.



TABLE 32

SITE SELECTION AND BASEMENT CONVERSION  
THROUGH TIME IN THE 1951 BUILT-UP AREA  
(BY NUMBER AND PERCENTAGE OF HOUSES)

Housing Characteristics	Prior to 1942		1942 to 1951		1952 to 1961	
Built prior to 1920	1	10.0	9	11.2	21	4.2
Built 1920 to 1929	4	40.0	8	10.0	18	3.6
Built 1930 to 1939	5	50.0	7	8.8	15	3.0
Built 1940 to 1949	-	-	56	70.0	293	58.7
Built after 1949	-	-	-	-	152	30.5
Cottages	1	10.0	15	18.8	68	13.6
Bungalows	8	80.0	46	57.5	328	65.7
1 1/2 storey houses	-	-	14	17.5	92	18.4
1 3/4 storey houses	1	10.0	-	-	1	.2
Two storey houses	-	-	5	6.2	10	1.7
Three storey houses	-	-	-	-	-	-
Good quality construction	5	50.0	16	19.9	123	24.6
Fair quality construction	4	40.0	55	68.8	336	67.3
Poor quality construction	1	10.0	9	11.3	40	8.0
Average floor area	925.4		882.3		869.2	
Average rooms	7.8		8.1		7.7	
Total houses	10		80		499	

Source: Twenty percent housing sample, Assessor's Department, City of Edmonton, 1970-71.



storey dwellings. Cottages, although they have generally retained single-family status, contributed their greatest share to basement conversions during the 1940s when housing in Edmonton was in particularly short supply. Because of their size, three storey houses were obvious choices for early multiple-family conversions, decreasing in importance thereafter, but only because their supply had diminished. Upper-storey suites have been added to one-and-a-half storey, one-and-three-quarter storey and two storey dwellings in a fairly regular ratio, although two storey buildings have slowly gained prominence (Table 31).

(3) Through time, conversion has been aimed primarily at houses of average grade construction. Basement conversions, though, have always occupied better quality houses than the other land uses. Recently, a small but increasing number of poorer quality houses has been added to the conversion inventory, particularly in the upper-storey and multiple-family categories.

(4) The largest houses have succumbed first to conversion, and only as the transition sequence has progressed have smaller houses been selected. For example, the average size of houses converted to multiple-family use prior to 1942 was fourteen rooms, but in the 1950s this size had decreased to ten rooms (Table 30). This trend also characterizes the other conversion types.





## SUMMARY

Morphology has a direct influence on the conversion process, and generalizations frequently stated in the literature are supported by the Edmonton data. In particular, the spread of conversion into different residential areas is closely related to the age of the housing stock. Edmonton's older areas, especially those built-up prior to 1920, now contain the highest proportions of converted dwellings. Conversion, in fact, decreases in intensity with increased distance from the central business district. Differentiation of the spatial pattern by types of conversion, though, has been largely influenced by the structural forms of an area's houses. The original quality and present condition of a neighbourhood's buildings has had little effect on the distribution pattern.

Within the 1951 built-up area, the prevalence, amount and type of conversion has been determined more by the size and style of a house than by its age. Throughout the transition process, two and three storey houses have been consistently sought for multiple occupancy, while bungalows have been the primary focus for basement conversions. Upper-storey suites have been added to a variety of types. Owners have adapted their houses to higher-density use shortly after purchase, generally remaining as the joint occupants. Further, the largest houses have been the first to



succumb to conversion and houses have been altered at various stages in their life cycles. Age is a more significant correlate at the areal level, setting a tone which is undoubtedly a spur to filtering down of the housing stock.



## Chapter VI

THE APARTMENT REDEVELOPMENT PROCESS  
IN TRANSITION AREAS

Apartment redevelopment has assumed primary importance in the restructuring of the inner-city's residential areas. It has supplanted conversion and created a new stage in the transition cycle. Several explanations, related to factors of supply and demand, have been advanced for the sharp increase in apartment construction.<sup>1</sup> On the demand side, changes in family income, family size and age structure, as well as changes in housing and locational preferences, have favoured an increase in apartments. On the supply side, apartment development has been encouraged by the high cost of serviced land for single-family homes, by improvements in construction techniques for multi-storey structures, and by the economies of scale associated with the construction of a large number of dwellings in a single complex.

In Edmonton, much of the apartment activity has been

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<sup>1</sup>See for example A. Bailly, "L'essor de l'habitat collectif dans les villes canadiennes," The Canadian Geographer, vol. 15, 1971, pp. 127-140; L. S. Bourne, "Market, Location, and Site Selection in Apartment Construction," The Canadian Geographer, vol. 12, 1968, pp. 211-226; and M. Neutze, The Suburban Apartment Boom, Baltimore, The Johns Hopkins University Press, 1968, 134 pp.





channelled to redeveloped sites within the older residential areas. How, then, has morphology influenced the redevelopment process? Are certain areas of the city favoured by developers? What properties are preferred in the selection of development sites? Thus, this chapter is concerned with ascertaining the relationship between redevelopment and the physical characteristics of a residential area. Specific themes include (1) identifying those areal qualities which attract apartment construction, (2) differentiating the site characteristics of redeveloped properties from those of non-redeveloped properties, and (3) determining the sequence of events in the site selection process.

## RESIDENTIAL MORPHOLOGY AND THE REDEVELOPMENT PROCESS

There are surprisingly few studies describing in detail the effects of morphology on the private redevelopment process. One exception is the recent work by Bourne who has examined the spatial parameters of apartment construction in Toronto.<sup>2</sup> Yet, even his study contains few housing characteristics as predictor variables, and other than land use types, the characteristics of

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<sup>2</sup>L. S. Bourne, Private Redevelopment of the Central City, Research Paper No. 112, Department of Geography, University of Chicago, 1967, 199 pp.



replaced properties are not analyzed.

Bourne hypothesized that the amount of apartment construction attracted to an area was a function of those conditions which existed in that area immediately prior to redevelopment. His study included variables which measured property size, qualities of the social and physical environment, accessibility, and the agglomerative effect of existing concentrations of apartments. These variables were analyzed for census tracts, using multiple regression techniques. Most correlations were noticeably weak. Accessibility to mass transportation and association with existing directions of apartment growth were important, but proximity to the city centre was not. Nor was redevelopment a correlate of an aging and depreciating housing stock. Although apartments in Toronto are apparently aligned with high-rent sectors, this relationship was not supported by the regression analysis. Large lot size, important for easy land assembly, was predictably significant.

These findings, particularly those concerning housing morphology, differ from the observations of several other authors. Smith, for example, claims that apartment redevelopment is clearly related to the age and obsolescence of buildings.<sup>3</sup> This interpretation

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<sup>3</sup>W. F. Smith, The Low Rise Speculative Apartment, Research Report No. 25, Centre for Real Estate and Urban Economics, Berkeley, University of California Press, 1964, p. 79.



is endorsed by Ratcliff and also by Hoover and Vernon.<sup>4</sup> Smith reports further that the replaced properties are typically single-family homes, occupied by renters, and frequently speculatively owned.<sup>5</sup> Except for the last characteristic, however, he does not present empirical data.

Bourne and Smith probably disagree in their interpretation of age and condition because they used different measurement scales. Bourne analyzed redevelopment at an areal level, whereas Smith examined individual properties. In Bourne's study, many older neighbourhoods, although developed during the same building era, have not experienced the same amount of apartment construction. A low correlation between age and redevelopment is the result. Yet in areas of actual redevelopment, which Smith examined, older properties were reportedly replaced in preference to newer houses. It is clearly necessary to mesh these measurement scales in one study and also to test a wider range of housing variables.

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<sup>4</sup>R. U. Ratcliff, Private Investment in Urban Redevelopment, Research Report No. 17, Centre for Real Estate and Urban Economics, Berkeley, University of California Press, 1961, 122 pp.; and E. M. Hoover and R. Vernon, Anatomy of a Metropolis, New York, Doubleday, 1959, 338 pp.

<sup>5</sup>Smith, op. cit., pp. 36-42.



## HOUSING CORRELATES OF THE APARTMENT REDEVELOPMENT PROCESS

### The Apartment Redevelopment Study Areas

Redevelopment in Edmonton is spatially discontinuous. For this reason, five major apartment districts and several arterials were selected for the detailed examination of the apartment redevelopment process.<sup>6</sup> The major districts include the Strathcona-University of Alberta area, the Northern Alberta Institute of Technology (N.A.I.T.) district, and the Parliament Hill, Oliver and Queens Avenue areas. These latter three are located to the south, west and north of the central business core (Figure 36). The arterials include 82, 124, 149 and 156 Streets and 118 Avenue. Together, these study areas have accounted for over 85 percent of the city's apartment redevelopment.<sup>7</sup> The boundaries of each area were determined by zoning.

The Parliament Hill and Oliver districts, once comprising the city's high-rent sector, are the oldest study areas (Table 33). Because of their proximity to the central business district,

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<sup>6</sup>Because other redevelopment processes, such as single-family and duplex construction, have not contributed specifically to transition area formation, they are not analyzed.

<sup>7</sup>Of the 2,042 houses redeveloped to walk-up and high rise apartments in Edmonton, 1,728 were replaced in these areas.





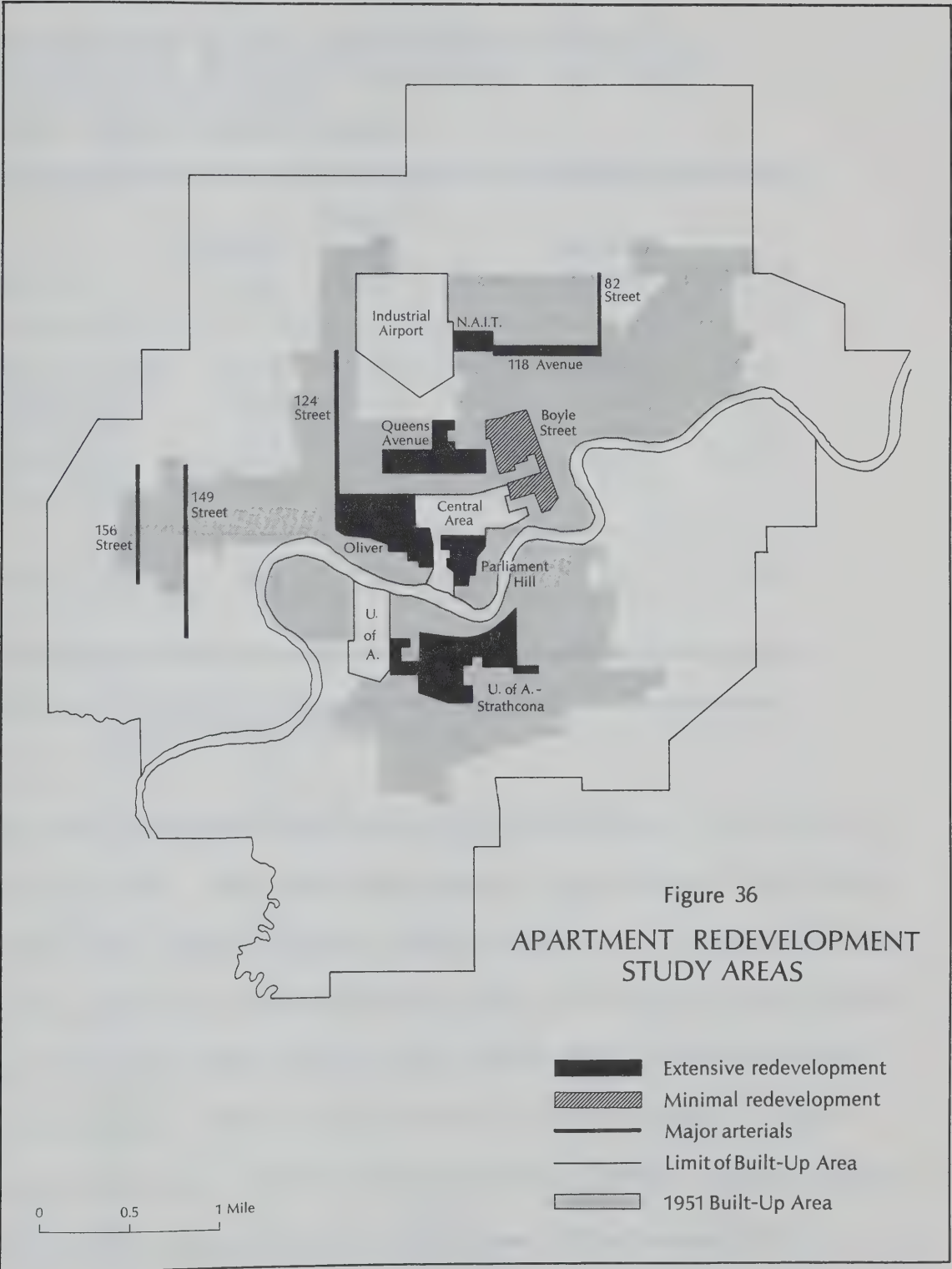


Figure 36  
APARTMENT REDEVELOPMENT  
STUDY AREAS



TABLE 33

SETTLEMENT OF THE MAJOR REDEVELOPMENT  
DISTRICTS BY THE PERIOD OF INITIAL OCCUPANCY  
OF EACH LAND PARCEL  
(DATA ARE IN PERCENTAGES)

Period	Strath- cona	Parlia- ment Hill	Oliver	Queens Avenue	N.A.I.T.
Prior to 1920	34.8	61.6	56.2	26.9	19.2
1920-1929	16.3	22.7	28.7	15.6	4.5
1930-1939	7.1	12.2	3.7	5.8	3.6
1940-1949	33.9	3.5	10.7	48.1	65.0
After 1949	7.9	-	.7	3.6	7.7
Total parcels	1,904	172	1,082	911	220

Source: Complete housing survey, Assessor's Department,  
City of Edmonton, 1970-71.

they were among the first areas to draw apartment construction in the late 1950s. They have been intensely redeveloped by high rises (Table 34). Queens Avenue, which has attracted two, three and four storey walk-ups, particularly since 1963, experienced single-family growth before 1920 and again in the 1940s when its western fringe was developed. The N.A.I.T. district is the youngest of all the study areas, having been built mainly in the 1940s. Walk-ups began first in 1963 and by 1971 over 65 percent of the houses had been



TABLE 34

TYPES OF REDEVELOPMENT IN THE MAJOR REDEVELOPMENT DISTRICTS  
(BY PERCENTAGE OF HOUSES REDEVELOPED TO NEW USES AND DWELLING UNITS ADDED)

Redevelopment Type	Strathcona		Parliament Hill		Oliver		Queens Avenue		N.A.I.T.		1951 Built-up Area	
Single-family	1.1	6	-	-	-	-	.3	1	.7	1	11.0	281
Duplexes	4.3	69	-	-	-	-	2.6	30	4.2	18	15.9	1,359
Walk-ups	62.0	2,390	10.3	143	49.8	2,150	94.6	3,268	93.1	1,038	58.3	13,340
High rises	21.1	2,417	67.9	1,869	42.7	3,618	-	-	-	-	14.8	9,227
Other <sup>1</sup>	11.5		21.8		7.5		3.5		2.0			
Totals	531	4,882	78	3,012	438	5,768	436	3,299	144	1,057	2,719	24,207

<sup>1</sup> Includes houses redeveloped to parking lots, vacant land and other uses permitted in apartment areas by zoning.

Source: Complete housing survey, Assessor's Department, City of Edmonton, 1970-71.





replaced (Table 35). Strathcona is of very mixed quality, partly

TABLE 35

STATUS OF HOUSES  
IN THE MAJOR REDEVELOPMENT DISTRICTS  
(BY NUMBER AND PERCENTAGE OF HOUSES)

Redevelopment District	Existing		Replaced		Total Houses
Strathcona	1,373	72.1	531	27.9	1,904
Parliament Hill	94	54.7	78	45.3	172
Oliver	644	59.5	438	40.5	1,082
Queens Avenue	525	57.6	386	42.4	911
N.A.I.T.	76	34.5	144	65.5	220

Source: Complete housing survey, Assessor's Department, City of Edmonton, 1970-71.

because its initial development was very drawn out and partly because it has been exposed to a variety of development pressures for a comparatively long time. Proximity to the University of Alberta, the central business district and an old business centre has produced a long-standing demand for rental accommodation. In this area, high rises adjoin the University's campus and front the river valley, while walk-ups characterize the interior.

The arterials, which will be analyzed separately from the major districts because of their special locational features, have



drawn considerable numbers of apartments to their fronting sites. The first to do so was 124 Street in the late 1950s. The others have been zoned for apartments only recently, but their original land use patterns have nevertheless been substantially altered. Development is one lot deep on each arterial except 118 Avenue, where apartments are permitted in the blocks which lie adjacent to the arterial.

### Measurement of Areal and Site Correlates

The effect of morphology on the redevelopment process was tested at two scales—areal and site. At the areal level, the sampled housing characteristics of the major redevelopment districts were compared to those of non-redeveloped areas and the entire 1951 built-up area. The intent was to determine if an area's morphology influences the location of redevelopment and hence the spatial development of the transition pattern.

To test additional relationships between redevelopment and morphology at an areal scale, a list of the enumeration areas which comprise each of the city's major redevelopment districts was compiled. These enumeration areas were then used to form the spatial framework for measuring areal correlates of redevelopment. The purpose was to determine if there were specific areas within the redevelopment districts which, because of their physical qualities, were more attractive than others for development.



To do so, apartment construction was correlated with those housing qualities which characterized an enumeration area immediately before change occurred. More specifically, the percentage of houses redeveloped to apartments between 1962 and 1971 was correlated with variables measuring the 1961 housing environment.<sup>8</sup> Separate programmes were run for walk-ups (35 areas; Figure 37) and high rises (14 areas; Figure 37).<sup>9</sup> Variables measuring residential morphology were grouped under land use type, parcel size, age and period of construction, occupancy status, and housing value and rent. Average income, an indicator of an area's social prestige, was also included.<sup>10</sup> These variables were transformed when

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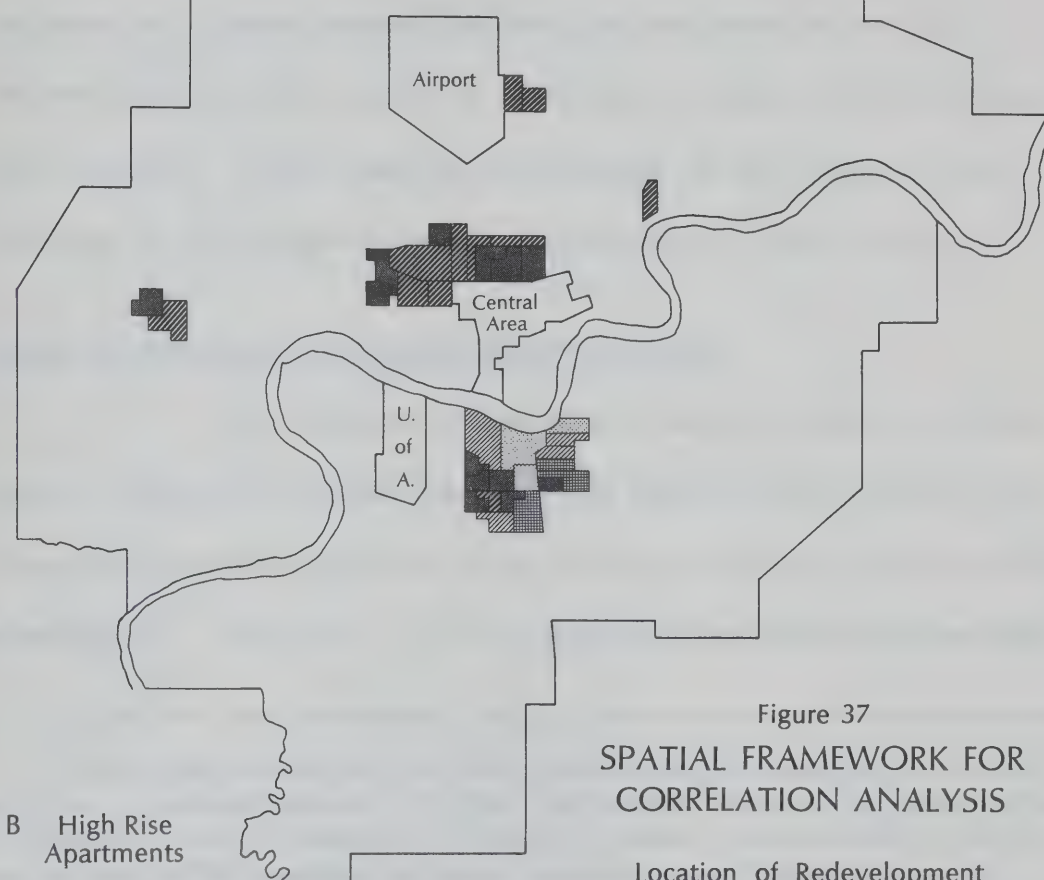
<sup>8</sup>A similar approach was used by Bourne, Private Redevelopment of the Central City, *op. cit.*, pp. 136-152. See also *idem*, "Location Factors in the Redevelopment Process: A Model of Residential Change," Land Economics, vol. 45, 1969, pp. 183-193.

<sup>9</sup>An enumeration area was included in an analysis if more than 75 percent of its housing stock fell within a zoned apartment area. Most enumeration areas fell entirely within a district. To include an area lying only partly within a zoned district would bias the correlation results, because redevelopment occurring in that area would not be a true reflection of the housing conditions of the entire enumeration area.

<sup>10</sup>Although not a measurement of housing quality, this variable was analyzed because it is commonly asserted in the literature that apartments are attracted to high-rent neighbourhoods. See for example H. Hoyt, The Structure and Growth of Residential Neighbourhoods in American Cities, Washington, United States Government Printing Office, 1939, p. 118.



## A Walk-Up Apartments



## B High Rise Apartments

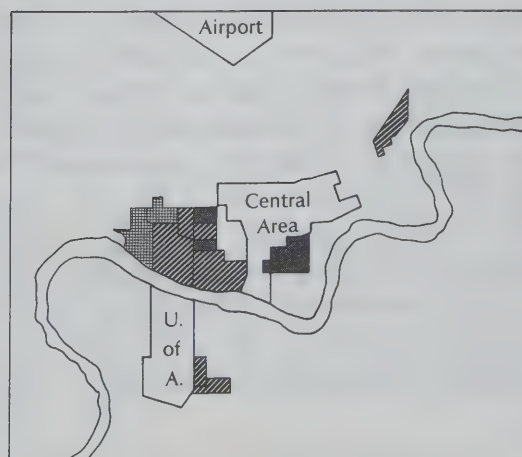
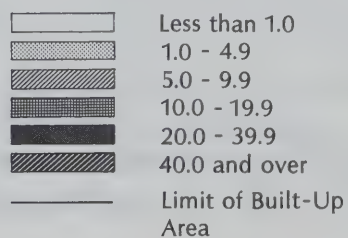


Figure 37  
SPATIAL FRAMEWORK FOR  
CORRELATION ANALYSIS

Location of Redevelopment  
Activity, 1962-1971

Percentage of Houses  
Redeveloped



Source: Assessor's Department, City of Edmonton, 1970-71

0 0.5 1 Mile





necessary to approximate normal distributions (Table 36).

For the site level analyses, housing characteristics were examined for both walk-up and high rise redevelopment. Comparisons were made between existing and replaced properties to determine the specific nature of structural change in the redevelopment process. These analyses were based on the complete data coverage of all properties in the redevelopment study areas.

#### Areal Correlates of Apartment Redevelopment

The location of apartments near the central business district, adjacent to major business and institutional centres, and along principal thoroughfares is an obvious reflection of accessibility advantages.<sup>11</sup> However, it is also apparent that redevelopment has

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<sup>11</sup>"The general purpose of this [apartment] district is to encourage the...redevelopment of older low density residential areas which by reason of their proximity to traffic routes, commercial centres and accessibility warrant a more economic and intensive use of land." City of Edmonton, Planning Department, Zoning Bylaw No. 2135, 1964, n.p. Similar locational tendencies have been noted in other Canadian and American cities. See for example H. J. Gayler, "Private Residential Redevelopment in the Inner City: The West End of Vancouver, Canada," Journal of the Town Planning Institute, vol. 57, 1971, pp. 15-20; H. Hoyt, "Expressways and Apartment Sites," Traffic Quarterly, vol. 12, 1958, pp. 263-268; G. A. Nader, "Some Aspects of the Recent Growth and Distribution of Apartments in the Prairie Metropolitan Areas," The Canadian Geographer, vol. 15, 1971, pp. 307-317; and P. J. Smith, "Change in a Youthful City: The Case of Calgary, Alberta," Geography, vol. 56, 1971, pp. 1-14.



TABLE 36

## HOUSING VARIABLES USED IN THE CORRELATION ANALYSIS

Variable Description	Data Source <sup>1</sup>	Transformation for Redevelopment Analyses <sup>2</sup>	
		Walk-ups	High Rises
Percentage of houses, redeveloped to walk-up apartments, 1962-1971	A		
Percentage of houses, redeveloped to high rise apartments, 1962-1971	A		
Percentage of houses, single-family residences	A		
Percentage of houses, basement conversions	A	L	L
Percentage of houses, upper-storey conversions	A	L	L
Percentage of houses, multiple-family conversions	A	L	
Percentage of houses, duplexes	A		
Number of apartment units	A		
Average parcel area	A		L
Average parcel width	A		L
Average age of houses	A		
Percentage of houses, built prior to 1920	A		S
Percentage of houses, built 1920-1929	A	L	
Percentage of houses, built 1930-1939	A	L	L
Percentage of houses, built 1940-1949	A		L
Percentage of houses, built after 1949	A	L	
Percentage of houses, good quality construction	A		



TABLE 36 (CONTINUED)

Variable Description	Transformation for		
	Data Source <sup>1</sup>	Redevelopment Walk-ups	Analyses <sup>2</sup> High Rises
Percentage of houses, fair quality construction	A		
Percentage of houses, poor quality construction	A		
Percentage of dwelling units, good condition	C	S	S
Percentage of dwelling units, need minor repairs	C		L
Percentage of dwelling units, need major repairs	C		L
Percentage of houses, owner-occupied	A		
Percentage of houses, renter-occupied	A		
Percentage of houses, owner and renter-occupied	A		
Median value of single-family houses	C		
Average contract rent	C		
Average income	C		

<sup>1</sup> Data were obtained from either the Assessor's Department (A) or the 1961 Census of Canada (C). The variables measuring the percentage of houses redeveloped to walk-up or high rise apartments were based on complete data coverage, while all other housing variables were derived from the 20 percent housing sample.

<sup>2</sup> L indicates a logarithmic (base 10) transformation and S a squared transformation.





not taken place with equal force in all the zoned apartment districts, notably to the northeast of the central core in the Boyle Street area (Figure 36). Is morphology, then, a possible explanation? From Table 37, which summarizes the important housing qualities of the major apartment and non-redeveloped areas, it is possible to evaluate the effect of morphology on the areal distribution of apartment redevelopment.<sup>12</sup>

Apartments have been attracted to areas with concentrations of older housing which was typically of fair or better construction quality. Conversion, indicating the demand for rental accommodation, is prevalent, while a supply of larger lots is available. These features are generally characteristic of the Strathcona, Parliament Hill, Oliver, Queens Avenue and N.A.I.T. districts, in which redevelopment is concentrated. The importance of the outlined factors is more apparent when these districts are compared to non-redevelopment areas. For example, the non-zoned areas are distinguished by post-1940 (70 percent), single-family (82 percent) and owner-occupied (67 percent) housing.

It is also obvious how several factors have hindered

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<sup>12</sup>The characteristics have been summarized for 1961, indicating the conditions which probably either encouraged or deterred the major thrust of apartment construction in the 1960s.



TABLE 37

SELECTED CHARACTERISTICS OF THE MORPHOLOGY OF THE MAJOR REDEVELOPMENT DISTRICTS, NON-REDEVELOPMENT AREAS AND THE 1951 BUILT-UP AREA, 1961  
(BY PERCENTAGE OF PROPERTIES)

Housing Characteristics	Strathcona	Parliament Hill	Oliver	Queens Avenue	N.A.I.T.	Boyle Street	Non-Redevelopment Areas	1951 Built-up Area
Built prior to 1920	34.9	61.7	54.3	24.9	17.4	63.0	13.8	23.4
Built 1920 to 1929	16.6	21.6	29.8	14.2	4.4	8.9	9.4	10.6
Built 1930 to 1939	6.2	16.7	4.7	8.3	4.4	2.6	6.7	6.7
Built 1940 to 1949	34.3	-	10.8	48.9	65.1	14.6	34.8	36.1
Built after 1949	8.0	-	.4	3.7	8.6	10.9	35.3	23.2
Parcels $\leq 4,300$ sq. ft.	10.7	20.6	33.2	19.3	-	88.3	21.9	24.2
Parcels $\geq 7,500$ sq. ft.	9.4	38.2	35.1	61.5	69.6	.7	19.8	20.5
Single-family residences	63.5	38.2	49.8	48.3	89.1	51.1	82.4	78.2
Duplexes	4.3	5.9	4.7	11.8	2.2	8.2	5.1	5.3
Converted dwellings	32.2	55.9	46.5	29.9	8.7	40.7	12.5	16.5
Good construction	25.5	14.7	26.9	15.0	4.4	7.5	19.4	19.3
Fair construction	64.9	67.6	59.2	78.6	73.9	66.7	60.2	60.2
Poor construction	9.8	17.7	13.9	6.4	21.7	25.1	20.4	20.5
Owner-occupied	52.3	14.7	33.6	37.4	63.0	33.7	67.0	63.7
Renter-occupied	23.3	58.8	35.5	33.7	28.3	29.4	19.3	21.1
Owner-renter occupied	24.4	26.5	30.9	28.9	8.7	36.9	13.7	16.2
Total properties	373	34	211	187	46	282	5,609	6,742

Source: Twenty percent housing sample, Assessor's Department, City of Edmonton, 1970-71.



development in the Boyle Street area.<sup>13</sup> Although it has been zoned for apartments for more than ten years, few properties have been redeveloped in this district. Here, housing is of a poorer quality than in any other district and most land parcels comprise only 3,960 square feet. Small lot size is a particular deterrent. Because zoning specifies that walk-up apartment sites in this district must be 8,600 square feet or greater (Table 38), a developer in most cases would need to purchase three properties to meet this requirement. In the other redevelopment areas, by contrast, where blocks were commonly subdivided into 7,500 square foot lots, the minimum zoning requirement for walk-up and high rise sites can often be met by assembling only two land parcels (Table 38). In terms of ease of land assembly, then, these areas are obviously more attractive for redevelopment than the Boyle Street district.

In a similar way, it is also apparent that, within the major apartment districts, some enumeration areas have been more intensely redeveloped than others (Figure 37). The question arises, have the housing characteristics of these sub-areas influenced this

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<sup>13</sup>Generalized discussions on factors which hinder redevelopment are contained in M. Colean, Renewing Our Cities, New York, The Twentieth Century Fund, 1953, 181 pp.; R. F. Muth, Cities and Housing, Chicago, University of Chicago Press, 1969, pp. 94-105; and R. W. Ratcliff, Urban Land Economics, New York, McGraw Hill, 1949, pp. 427-431.



TABLE 38

SURVEYED LOT SIZE AND MINIMUM ZONING  
REQUIREMENTS FOR APARTMENT SITES  
IN THE MAJOR REDEVELOPMENT DISTRICTS

Redevelopment District	Walk-up Apartment Sites (Square Feet)	High Rise Apartment Sites (Square Feet)	Surveyed Lot Size <sup>1</sup> (Square Feet)
Strathcona	8,600	14,500	4,356
Parliament Hill	8,600	14,500	7,500
Oliver	8,600	14,500	7,500
Queens Avenue	8,600		7,500
N.A.I.T.	8,600		7,500
Boyle Street	8,600		3,960

<sup>1</sup> Surveyed lot size, as determined from the original subdivision plans, refers to the most common lot size initially surveyed in each redevelopment district.

Sources: City of Edmonton, Planning Department, Zoning Bylaw No. 2135, 1964; and Assessor's Department, City of Edmonton, 1970-71.

pattern? To answer this question, correlation analyses were programmed to determine the effects of the housing qualities of enumeration areas on the intensity of redevelopment. The results of these analyses are presented in Table 39. Generally, the correlations are weak and of marginal statistical significance.

At the enumeration area level, the developers of walk-ups have sought locations with large lots ( $r = .621$ ) and





TABLE 39

SPATIAL ASSOCIATION BETWEEN APARTMENT  
REDEVELOPMENT AND SELECTED HOUSING  
CHARACTERISTICS FOR ENUMERATION AREAS  
IN THE ZONED APARTMENT DISTRICTS  
(SIMPLE CORRELATION COEFFICIENTS)

Housing Characteristics	Walk-ups	High Rises
Single-family residences	.286*	.158
Basement conversions	-.159	-.373
Upper-storey conversions	-.283*	-.543*
Multiple-family conversions	-.159	.272
Duplexes	-.287*	-.468*
Apartment units	.110	-.119
Average parcel area	.621***	-.237
Average parcel width	.447**	-.163
Average age	-.153	.222
Built prior to 1920	-.200	.051
Built 1920 to 1929	-.029	.216
Built 1930 to 1939	.333**	-.340
Built 1940 to 1949	.131	-.239
Built after 1949	-.170	-.242
Good construction	-.518***	-.028
Fair construction	.345**	-.074
Poor construction	.107	-.397
Good condition	.158	.295
Need minor repairs	.216	-.313
Need major repairs	.065	-.416
Owner-occupied	.194	.276
Renter-occupied	.146	.054
Owner-renter occupied	-.370**	-.448*
Median house value	-.098	.168
Average rent	.081	.410
Average income	-.103	.401
	N = 35	N = 14

\*\*\*Significant at .001 level; \*\*Significant at .01 level;

\*Significant at .05 level.

Source: Calculated by author.



frontages ( $r = .447$ ) in which the houses were of fair construction quality ( $r = .345$ ) and of single-family status ( $r = .286$ ). Land use type, housing condition and age have had little effect on location patterns at this scale. The apparent absence of an age-redevelopment relationship is readily explained. The component areas of each redevelopment district possess very similar age profiles, with the result that at the sub-area level, age has little bearing on the developer's location decision. Measures of socio-economic status also proved to be of minor significance (income  $r = -.103$ ).

High rises, in contrast, show their strongest positive relationships with average rent ( $r = .410$ ) and with average income ( $r = .401$ ), confirming the earlier generalization that high rises do indeed seek out neighbourhoods of higher social prestige (see Chapter III). This contention is further supported by the negative correlations between the percentage of houses redeveloped to high rises and the percentage of dwellings needing major repairs ( $r = -.416$ ) and between high rise redevelopment and houses of poor construction quality ( $r = -.397$ ). Variables representing the housing age, property size and land use profiles of the sub-areas have had marginal influence on high rise location. Concentrations of upper-storey conversions and houses occupied jointly by owners and renters, though, have resisted development.



Within the zoned redevelopment districts, then, the immediate neighbourhood environment has generally had little effect on the redevelopment process. Although walk-up developers have favoured areas with larger lots and high rise developers have chosen better quality environments, other housing characteristics have had little influence. This is because the sub-areas of the major redevelopment districts show little differentiation. The spur for redevelopment has already been set at a regional scale, attracting apartments to areas with concentrations of older but good quality housing which has been subjected to conversion pressures.

#### Site Correlates of Apartment Redevelopment

Parcel Size. Parcel size is an important consideration in the redevelopment process: "properties that are deep and wide are invariably sought out (for apartment sites)."<sup>14</sup> In the study areas, two distinct lot sizes were initially surveyed. In Strathcona, on Edmonton's south side, the standard lot size is 33 feet by 132 feet, or 4,356 square feet. In the other study areas, located to the north of the river, many lots are 50 feet wide and 150 feet deep, totalling 7,500 square feet (Table 38). Some lots in each area have been

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<sup>14</sup>E. T. Rashleigh, "Observations on Canadian Cities, 1960-1961," Plan Canada, vol. 3, 1962, p. 71.





further replotted into smaller parcels, especially in the Oliver district (Table 37).

As noted previously, the current zoning bylaw stipulates that the walk-up and high rise sites comprise a minimum of 8,600 and 14,500 square feet (Table 38). To meet this size requirement, and also to reduce land assembly costs, a developer will try to select larger properties. For example, land sales records collected for this study revealed that a development site consisting of two 7,500 square foot lots could be purchased more reasonably than one comprising three 5,000 square foot lots, even though the total area is the same (15,000 square feet). Because a homeowner typically bases his asking price on the quality of his house and not on the size of his property, he will expect an offer equal to that received by his neighbour, even though his neighbour's property might be larger.<sup>15</sup> It is to be expected, then, that the apartment builder will concentrate his efforts on larger properties. This is indeed the case in each of the study areas, whether the land has been sought for a walk-up or a high rise site. Redeveloped properties are clearly larger in size than existing properties (Table 40). In Strathcona, for example, parcels going to walk-ups averaged just

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<sup>15</sup>This reason was expressed to the author during conversation with City of Edmonton zoning officials.



TABLE 40

PARCEL SIZE AND SITE CHARACTERISTICS OF EXISTING AND REPLACED  
PROPERTIES IN THE MAJOR REDEVELOPMENT DISTRICTS  
(BY AVERAGE PARCEL AREA AND WIDTH)

Redevelopment District	Walk-Ups		High Rises		All Redevelopment <sup>1</sup>		Existing	
	Area	Width	Area	Width	Area	Width	Area	Width
Strathcona	5,521	42	5,596	43	5,486	42	4,803	38
Parliament Hill	7,969	53	6,517	44	6,854	47	5,945	47
Oliver	6,177	42	6,093	42	6,118	42	5,775	42
Queens Avenue	6,797	46	-	-	6,776	46	6,422	45
N.A.I.T.	7,215	48	-	-	7,211	48	6,933	48

<sup>1</sup> Includes properties redeveloped to single-family, duplex, walk-up, high rise, and non-residential uses.

Source: Complete housing survey, Assessor's Department, City of Edmonton, 1970-71.



over 5,500 square feet, whereas non-redeveloped sites average 4,800 square feet. In the N.A.I.T. district, which has lost a greater proportion of its houses than any other district, the replaced parcels are the largest of all the study areas, averaging 7,200 square feet.

Residential Types. Walk-up and high rise redevelopment has been directed primarily at single-family residences. Of the houses succumbing to walk-ups, the single-family range is from 63 percent in the Parliament Hill area to 97 percent in the N.A.I.T. district (Table 41). More converted dwellings have been replaced by high rises than by walk-ups, but only because there are more conversions in the high rise apartment areas.

Because single-family houses constitute the majority of the replaced residences, it may be inferred that these properties are strongly preferred in the selection of redevelopment sites. This assumption is erroneous. The replacement ratios of the different land use types are, in fact, quite similar. In the Oliver district, as an example, the replacement ratios of the different land use types range between 35 and 45 percent (Table 42). Duplexes in the other study areas, however, provide an exception. They are the most resistant to change. Their owners, when interviewed, frequently reported a reluctance to sell because they did not want to lose the



TABLE 41

RESIDENTIAL LAND USE TYPES AND SITE CHARACTERISTICS OF EXISTING  
AND REPLACED PROPERTIES IN THE MAJOR REDEVELOPMENT DISTRICTS  
(BY PERCENTAGE OF HOUSES)

Residential Land Uses	Strathcona			Parliament Hill			Oliver			Queens Avenue			N.A.I.T.		
	WA	HRA	All <sup>1</sup>	Exist	WA	HRA	All	Exist	WA	HRA	All	Exist	WA	HRA	All
Single-family residences	70.5	80.4	73.8	61.1	62.5	50.0	46.2	34.0	69.1	55.6	61.0	53.4	74.5	-	74.9
Basement conversions	9.2	4.5	7.9	13.5	-	-	-	5.3	2.8	2.6	2.7	3.4	13.2	-	13.2
Upper-storey conversions	8.3	2.7	7.2	5.7	37.5	17.3	17.9	9.6	7.8	11.1	9.6	5.5	3.0	-	3.1
Multiple-family conversions	8.9	11.6	8.9	10.9	-	26.9	32.1	41.5	13.8	27.5	21.7	27.8	4.7	-	4.4
Duplexes	3.1	.9	2.3	8.8	-	3.8	2.6	9.6	6.0	2.6	4.6	5.6	4.7	-	4.4
Duplex conversions	-	-	-	-	-	1.9	1.3	-	.5	.5	.5	1.2	-	-	.6
Total percentages	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Total number of houses	325	122	531	1,373	8	52	76	94	217	189	438	644	365	-	386
														131	144
														76	

<sup>1</sup> Includes properties redeveloped to single-family, duplex, walk-up, high rise and non-residential uses.

Source: Complete housing survey, Assessor's Department, City of Edmonton, 1970-71.





TABLE 42

RESIDENTIAL LAND USE TYPES AND STATUS OF HOUSES  
IN THE MAJOR REDEVELOPMENT DISTRICTS  
(BY PERCENTAGE OF HOUSES)

Status of Houses	SF	D	BC	USC	MFC
Strathcona					
Existing	68.2	91.0	81.6	67.2	76.0
Replaced <sup>1</sup>	31.8	9.0	18.4	32.8	24.0
Total houses	1,231	133	228	116	196
Parliament Hill					
Existing	47.1	81.8	100.0	39.1	60.9
Replaced	52.9	18.2	-	60.9	39.1
Total houses	68	11	5	23	64
Oliver					
Existing	54.7	64.3	64.7	56.7	65.3
Replaced	45.3	35.7	35.3	43.3	34.7
Total houses	611	56	34	97	274
Queens Avenue					
Existing	52.4	74.2	62.8	70.7	70.2
Replaced	47.6	25.8	37.2	29.3	29.8
Total houses	607	66	137	41	57
N.A.I.T.					
Existing	29.8	100.0	64.3	-	-
Replaced	70.2	-	35.7	-	-
Total houses	198	-	14	-	-

<sup>1</sup>Includes properties redeveloped to single-family, duplex, walk-up, high rise and non-residential uses.

Source: Complete housing survey, Assessor's Department, City of Edmonton, 1970-71.



income secured from their properties. More important, perhaps, is the fact that duplexes are comprised mainly of newer houses, and developers have probably preferred older, cheaper properties.

House Age. Data collected for this study indicates that the aging of the housing stock has considerable significance in the selection of sites for apartments. This is particularly noticeable when the age distributions of replaced and existing houses are compared (Table 43). Dwellings built prior to 1920 clearly make up the majority of the redeveloped properties. Walk-up developers in particular have selected houses from this building period.

Differences existing among the areas have resulted from original settlement patterns. In the older Strathcona, Parliament Hill and Oliver districts, over 55 percent of the replaced houses showed pre-1920 construction dates. Even in the Queens Avenue and N.A.I.T. areas, which were not fully developed until after World War II, older houses, when available, have been preferred choices. Although houses built since 1940 comprise the majority of redeveloped properties in these areas, higher replacement ratios have been experienced by the oldest age categories (Table 44). This evidence, which applies with equal force to each area, further confirms the role of aging in the site selection process.



TABLE 43

HOUSE AGE AND SITE CHARACTERISTICS OF EXISTING AND  
REPLACED PROPERTIES IN THE MAJOR REDEVELOPMENT DISTRICTS  
(BY PERCENTAGE OF HOUSES)

Construction Period	Strathcona			Parliament Hill			Oliver			Queens Avenue			N.A.I.T.							
	WA	HRA	All <sup>1</sup>	Exist	WA	HRA	All	Exist	WA	HRA	All	Exist	WA	HRA	All					
Prior to 1920	57.2	23.2	51.8	28.3	87.5	57.7	64.2	59.6	55.8	58.7	58.6	54.5	29.0	-	31.1	23.8	21.4	-	25.0	7.9
1920 to 1929	10.2	33.9	15.8	16.5	-	28.8	24.2	21.3	33.2	31.2	31.1	27.0	22.2	-	21.8	11.0	5.3	-	5.6	2.6
1930 to 1939	2.5	20.5	7.2	7.1	-	9.6	7.7	16.0	.9	1.6	1.1	5.4	5.2	-	5.2	6.3	3.8	-	3.5	3.9
1940 to 1949	29.5	21.4	24.7	37.4	12.5	3.8	3.5	3.2	10.1	7.4	8.7	12.1	42.5	-	40.9	53.3	67.9	-	64.6	65.8
After 1949	.3	.9	.6	10.7	-	-	-	-	-	1.1	.5	1.0	1.1	-	1.1	5.6	1.5	-	1.4	19.8
Average age	43.8	40.5	43.3	38.5	49.5	45.8	47.5	53.8	45.8	47.9	47.1	50.1	34.8	-	35.2	35.6	31.1	-	32.1	27.2
Total percentages	100	100	100	100	100	100	100	100	100	100	100	100	100	-	100	100	100	-	100	100
Total number of houses	325	112	531	1,373	8	52	78	94	217	189	438	644	365	-	386	525	131	-	144	76

<sup>1</sup>Includes properties redeveloped to single-family, duplex, walk-up, high rise and non-residential uses.

Source: Complete housing survey, Assessor's Department, City of Edmonton, 1970-71.





TABLE 44

PERIOD OF CONSTRUCTION AND STATUS OF HOUSES  
IN THE MAJOR REDEVELOPMENT DISTRICTS  
(BY PERCENTAGE OF HOUSES)

Status of Houses	Prior to 1920	1920 to 1929	1930 to 1939	1940 to 1949	After 1949
Strathcona					
Existing	58.6	72.9	71.8	79.7	99.0
Replaced <sup>1</sup>	41.4	27.1	28.2	20.3	1.0
Total houses	644	310	135	645	150
Parliament Hill					
Existing	52.8	51.3	71.4	50.0	-
Replaced	47.2	48.7	28.6	50.0	-
Total houses	106	39	21	6	-
Oliver					
Existing	57.7	56.1	87.5	67.2	75.0
Replaced	42.3	43.9	12.5	32.8	25.0
Total houses	608	310	40	116	8
Queens Avenue					
Existing	51.0	40.8	62.3	63.9	87.9
Replaced	49.0	59.2	37.7	36.1	12.1
Total houses	245	142	53	438	33
N.A.I.T.					
Existing	14.3	20.0	37.5	35.0	88.2
Replaced	85.7	80.0	62.5	65.0	11.8
Total houses	42	10	8	143	17

<sup>1</sup>Includes properties redeveloped to single-family, duplex, walk-up, high rise and non-residential uses.

Source: Complete housing survey, Assessor's Department, City of Edmonton, 1970-71.



House Quality. The Assessor's Department, unfortunately, does not record the present condition of buildings. Therefore, it is impossible to determine precisely the role of poor housing quality in the redevelopment process. However, it is possible to piece together certain evidence to provide at least a partial answer. Similar to the findings of the correlation analyses, this evidence suggests that poor or deteriorating condition was of only limited importance. Although the proportion of poorly built houses which now exists in each area is smaller than before redevelopment occurred, most replaced houses were of fair or good construction, as are the existing houses. This indicates that better housing quality is a more important prerequisite for attracting redevelopment (Table 45). In addition, few of the replaced dwellings had exceeded their assessed life expectancy. Deterioration, then, would not be advanced to the extent that renewal was mandatory. Further, the fact that many houses were moved off their sites, rather than demolished, indicates that poor condition was not widespread. The higher demolition rates in Parliament Hill and Oliver are a result of a predominance of two storey houses which, because of their size, are generally unsuitable for relocation.

Ownership Status. Three groups of variables which are related to ownership status were analyzed. These include occupancy type when







redeveloped, length of ownership, and frequency of ownership change. These variables were evaluated to test those assertions commonly made in the literature which claim that redevelopment is associated primarily with speculative, short-term ownership.<sup>16</sup> The findings are not conclusive. When redeveloped, houses in most areas were equally grouped between owner and renter occupancy (Table 46). Renter occupancy was more prevalent in the Parliament Hill and Oliver areas but, because of their central location, this is an expected occurrence. It was noted, though, that many of the absentee owners in these areas were mortgage, real estate and other land holding companies, typical holders of speculative properties.

Short-term ownership is also reportedly associated with speculation, but the Edmonton data show that developers have purchased their sites mainly from owners who have held their properties for six or more years. Less than three year ownership accounted for only about 20 percent of the replacements in each study area, suggesting that speculative buying, at least short-term holding, is not widespread (Table 46). In addition, data on frequency of ownership change gave little indication that redevelopment areas are characterized by increased selling activity. Few properties,

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<sup>16</sup>W. F. Smith, The Low Rise Speculative Apartment, op. cit., pp. 36-42.





TABLE 46

OCCUPANCY TYPE, LENGTH OF OWNERSHIP, NUMBER OF OWNERS AND SITE CHARACTERISTICS  
OF EXISTING AND REPLACED PROPERTIES IN THE MAJOR REDEVELOPMENT DISTRICTS  
(BY PERCENTAGE OF HOUSES)

Ownership Characteristics	Strathcona			Parliament Hill			Oliver			Queens Avenue			N.A.I.T.		
	WA	HRA	All <sup>1</sup>	Exist	WA	HRA	All	Exist	WA	HRA	All	Exist	WA	HRA	All
Owner-occupied	43.4	44.7	42.7	41.4	37.5	17.3	17.9	11.7	33.2	23.2	27.1	26.7	37.5	-	37.8
Renter-occupied	43.4	50.0	47.5	36.2	50.0	69.2	60.3	74.5	57.1	59.3	59.1	52.6	48.2	-	48.4
Owner-renter occupied	13.2	5.4	9.8	22.4	12.5	13.5	21.8	13.8	9.7	17.5	13.7	20.7	14.2	-	13.8
Less than 3 years	19.7	14.3	18.6	14.0	25.0	21.1	21.8	43.7	22.6	17.4	19.6	17.7	18.6	-	18.9
3-5 years	19.3	17.8	21.7	14.4	62.5	21.1	25.6	12.9	18.9	15.9	16.9	13.1	14.7	-	15.3
6-10 years	23.4	20.6	24.4	16.9	12.5	48.1	42.3	13.7	24.4	24.3	31.3	17.7	18.5	-	22.2
More than 10 years	37.6	47.3	35.3	54.7	-	9.7	10.3	29.7	34.1	42.4	32.2	52.5	48.2	-	43.6
1 owner	36.0	35.7	38.0	34.2	25.0	40.4	41.0	18.1	31.8	34.9	34.5	30.7	38.4	-	38.6
2 or 3 owners	49.9	57.2	54.1	48.9	50.0	55.7	52.6	65.9	54.3	57.6	55.2	54.2	49.1	-	48.2
4 or more owners	14.1	17.1	17.9	16.9	25.0	3.9	6.4	16.0	13.9	7.5	10.3	15.1	12.5	-	13.2
Total houses	325	112	531	1,373	8	52	76	94	217	189	438	644	365	-	386
														131	144
														76	76

<sup>1</sup>Includes properties redeveloped to single-family, duplex, walk-up, high rise and non-residential uses.

Source: Complete housing survey, Assessor's Department, City of Edmonton, 1970-71.



either redeveloped or existing, have changed ownership more than three times (Table 46).<sup>17</sup>

Two other trends, both related to site selection, are noteworthy. These show that developers have had considerable trouble purchasing properties from owner-occupiers who also rent out some of their accommodation. In the N.A.I.T. area, for example, less than 2 percent of the redeveloped houses were jointly occupied, yet nearly 20 percent of the remaining houses are. In addition, in each of the study areas there is a core of long-term homeowners from whom developers have had difficulty acquiring apartment sites. From interviews it was determined that most are owner-occupiers who are reluctant to relinquish long-established ties with their homes and neighbourhoods.

#### Site Selection and Walk-Up Apartment Redevelopment Along Major Arterials

Although apartment sites along arterials are in high demand because of their obvious accessibility advantages, their selection is very similar to the redevelopment process in the major apartment districts. Larger land parcels have been particularly favoured, especially in the 118 Avenue district (Table 47). Here,

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<sup>17</sup>The percentage values displayed in this table are very similar to ownership change data for the entire 1951 built-up area.



TABLE 47

WALK-UP APARTMENT SITE SELECTION AND HOUSING CHARACTERISTICS  
OF EXISTING AND REPLACED PROPERTIES ALONG THE MAJOR ARTERIALS  
(BY PERCENTAGE OF HOUSES)

Housing Characteristics	118 Avenue		82 Street		124 Street		149 Street		156 Street	
	Rede	Exist	Rede	Exist	Rede	Exist	Rede	Exist	Rede	Exist
Average parcel area	7,276	4,640	7,754	6,642	7,328	6,804	7,705	7,780	7,878	7,534
Average parcel width	49	36	52	44	49	48	52	55	53	51
Average age	41	39	37	29	28	29	20	19	21	19
Built prior to 1920	44.4	31.7	39.5	12.2	22.0	14.6	-	-	-	-
Built 1920 to 1939	25.4	20.0	16.7	18.4	13.0	10.4	11.2	28.6	5.2	-
Built after 1939	30.2	48.3	43.8	69.4	65.0	65.0	88.8	71.4	94.8	100.0
Single-family	92.1	80.7	93.8	67.3	70.0	45.8	96.3	76.2	87.5	78.3
Duplexes	-	6.2	-	16.3	9.0	27.1	1.8	14.3	1.0	15.0
Converted dwellings	7.9	13.1	6.2	16.4	21.0	27.1	1.9	9.5	11.5	6.7
Good construction	9.5	14.7	6.3	24.4	17.0	31.3	-	4.8	4.2	5.0
Fair construction	41.3	66.7	66.7	63.3	55.0	62.5	77.8	95.2	68.8	76.7
Poor construction	49.2	18.6	27.1	12.3	28.0	6.2	22.2	-	27.0	18.3
Demolished	66.7	-	64.6	-	35.0	-	27.8	-	45.8	-
Owner-occupied	44.5	60.9	54.2	34.7	35.0	22.9	68.5	47.6	52.1	40.0
Renter-occupied	52.4	25.4	43.8	44.9	51.0	52.1	29.6	38.1	46.9	41.7
Owner-renter	3.2	13.7	2.0	20.4	14.0	25.0	1.9	14.3	1.0	18.3
Total properties	63	631	48	49	100	48	54	21	96	60

Source: Complete housing survey, Assessor's Department, City of Edmonton, 1970-71.





developers have assembled sites comprised of two or more of the 7,500 square foot lots which characterize the northside blocks, but they have virtually shunned the southside blocks where the lots average less than 5,000 square feet. In addition, older properties, many in single-family use, have been preferred. Duplexes have been noticeably avoided. Although homes of fair construction quality dominate the arterials, poorer quality houses, which have likely fallen into disrepair, have been redeveloped at a higher ratio. Joint owner-renter occupancy has deterred redevelopment along each thoroughfare, just as it has in the major redevelopment districts, but other occupancy types have had little bearing on the redevelopment process.

#### Site Selection and Apartment Redevelopment Through Time

Data on the replacement sequence are essential for devising a stage model of transition area development. Therefore, the housing characteristics of redeveloped properties were summarized by successive years from 1960 to 1971. Redevelopment prior to 1960 was grouped under one heading. An aggregate version of the replacement sequence for walk-up and high rise redevelopment along the major arterials and in the redevelopment districts is displayed in Table 48. Appendix B contains the summaries for individual areas.



TABLE 48

SUMMARY OF SITE SELECTION AND APARTMENT REDEVELOPMENT THROUGH TIME  
FOR THE MAJOR ARTERIALS AND REDEVELOPMENT DISTRICTS<sup>1</sup>  
(BY PERCENTAGE OF HOUSES)

Housing Characteristics	≤1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
Average parcel area	7,474	8,264	8,493	7,484	6,916	6,057	6,426	5,846	6,431	6,320	6,466	6,462	5,588
Average parcel width	50	56	60	52	48	45	45	42	44	44	45	45	39
Average age	42	46	42	38	40	45	39	43	39	37	36	35	38
Built prior to 1920	67.2	85.0	70.0	47.2	52.5	54.8	44.0	49.5	39.2	34.0	29.2	25.4	13.2
Built 1920 to 1939	18.8	10.0	10.0	28.6	22.2	37.0	25.8	30.9	23.1	19.6	22.3	11.4	51.2
Built after 1939	10.0	5.0	20.0	24.2	25.3	8.2	30.2	19.6	37.7	46.4	48.5	63.2	36.6
Single-family	87.5	70.0	75.0	58.6	79.8	83.3	76.7	73.2	67.1	75.1	72.9	77.2	82.9
Converted dwellings	10.3	25.0	25.0	40.0	18.3	16.7	20.8	24.7	29.3	20.9	24.8	19.0	12.2
Good construction	10.0	20.0	15.0	19.9	13.1	16.7	12.9	14.4	15.1	15.8	18.7	25.4	12.2
Fair construction	48.8	55.0	70.0	60.0	61.6	58.3	75.9	69.1	67.9	70.1	68.0	64.5	75.6
Poor construction	41.2	25.0	15.0	20.1	25.3	25.0	11.2	16.5	17.0	14.1	13.3	10.1	12.2
Demolished	82.5	90.0	95.0	62.9	53.5	58.3	54.3	64.9	61.5	49.5	54.0	44.3	85.4
Owner-occupied	36.2	35.0	15.0	27.1	38.4	47.6	37.9	40.2	35.7	45.8	42.5	36.7	39.0
Renter-occupied	58.8	60.0	75.0	57.1	53.5	46.4	50.9	47.4	52.0	43.0	45.5	53.2	54.9
Owner-renter	5.0	5.0	10.0	15.7	8.1	6.0	11.2	12.4	12.3	11.2	12.0	10.1	6.1
Average cost	11,678	19,147	19,391	21,132	16,356	18,059	16,580	15,584	17,281	18,215	24,935	22,784	22,739
Total properties	80	20	20	70	99	84	116	97	252	321	391	79	82

<sup>1</sup>The summary is for walk-up and high rise redevelopment.

Source: Complete housing survey, Assessor's Department, City of Edmonton, 1970-71.



From these tables, then, it is possible to produce a definitive interpretation of the dynamics of site selection. The following are the major trends; they have occurred in similar fashion in each area.

(1) Redevelopment has been directed first at the largest land parcels, with the average size selected decreasing as redevelopment has proceeded.

(2) Developers have sought out the oldest properties in the initial stages of redevelopment, later turning their attention to more recently constructed homes. For example, prior to 1960 nearly 70 percent of the replaced properties were built prior to 1920, whereas in 1971 this age group contributed less than 15 percent (Table 48). Even in the older Oliver and Strathcona districts, the same trend is apparent (Appendix B; Tables 1 and 3).

(3) There is little temporal differentiation in the selection of residential land use types. Developers have always chosen single-family residences and conversions in a fairly equal ratio.

(4) Buildings of poor original construction quality, which have probably lapsed into disrepair, were definitely sought in the initial phases of redevelopment. Prior to 1960, for example, they totalled over 40 percent of the redeveloped houses. Once these were replaced, however, quality was not of apparent influence.

(5) Throughout the site selection process, developers have



purchased properties from the three ownership-occupancy types in a fairly consistent ratio.

(6) During the course of redevelopment, land prices have risen considerably in each area. This is an expected occurrence, because in the early stages of redevelopment, older and poorly maintained houses can be purchased more reasonably than newer, better quality properties. Once redevelopment was well-established, however, age and quality was observed to have little effect on prices. It is also notable that once redevelopment has peaked and then declined in an area, land costs have fallen slightly. The cost of land had probably risen to a level which discouraged development, with the result that property owners were forced to reduce their asking prices. Furthermore, rising costs in the earliest established apartment areas have caused developers to pressure for new development locations. The N.A.I.T. area was opened under such circumstances. The obvious result is a shift in the transition pattern.

## SUMMARY

Morphology has influenced the spatial and sequential development of redevelopment areas. Apartments have been drawn to neighbourhoods with positive environmental amenities, thus assuring the success of a developer's investment. These spatial





amenities include concentrations of older housing which has maintained its quality, a supply of larger lots for ease of property assembly, and the presence of conversions, indicating an established demand for rental accommodation. High rise developers have been particularly discriminating in their location decisions, seeking out the high rent districts. However, within each apartment district, the housing characteristics of component sub-areas have generally had little influence on the location of apartments. Further, areas of lower social prestige, such as Boyle Street, which are characterized by an aging and deteriorating housing stock, have been rejected by the developer. At the same time, newer areas of post-war housing have yet to experience redevelopment pressures.

At the site level, there is a definite sequential pattern in the redevelopment process. In the initial stages, developers have quickly purchased larger land parcels, often occupied by older and sometimes poorer quality houses. Developers acquire their properties from homeowners and speculators alike. As redevelopment progresses, newer and better maintained dwellings are selected, and there tends to be little differentiation between these and non-redeveloped properties. The long-term owner-occupier, though, is often reluctant to relinquish his property.

These findings show how different measurement scales



have influenced previously reported findings. For example, Bourne's areal conclusions are, to a certain extent, true, because not all older areas, even though zoned for apartments, have attracted redevelopment. At the site level, however, there is a demonstrated tendency for older properties to be favoured for development sites.



## Chapter VII

A MODEL OF THE CHANGING PHYSICAL MORPHOLOGY  
OF TRANSITION AREAS

Various aspects of residential change have long attracted attention in urban research. Burgess and Hoyt, for example, explored this theme in their models of urban structure. Yet there have been few analyses of the processes of change which mould and reshape the residential environment. As a result, the development of a theory of residential transition has been impeded. Such a theory should comprise an explanation of the changing physical morphology and social mosaic of residential areas. These are the two basic divisions of residential structure. Within this framework, a comprehensive theory would also contain spatial and aspatial interpretations. Geographers, then, can contribute the necessary spatial component for a theory of residential areas in transition.

Because the changing physical morphology of residential areas has been neglected in research to date, and because analyses of processes of change are a prerequisite to theory building, this study has examined how conversion and redevelopment have induced change in the housing and land use structure of residential areas. Land use and physical changes were specifically examined because they are the most readily measured facets of changing





physical morphology. To interpret the conversion and redevelopment processes, this study focussed on the relationship between change and housing characteristics. These variables were chosen because accurate housing data were available, because their role has been neglected in previous studies, and because they were the most meaningful indicators of change.

The research approach to theory building was inductive. To this end, two descriptive models of transition area development were outlined and empirically tested. One measured the spatial expression through time of conversion and redevelopment, while the other showed how these processes have interacted during the stage development of transition areas. Then, housing characteristics were analyzed to determine their effects on conversion and redevelopment. From the findings of these analyses, it is possible to offer a more thorough description of the spatial and sequential development of transition areas. This will be done through the presentation of a model of the changing physical morphology of transition areas.

#### A MODEL OF THE CHANGING PHYSICAL MORPHOLOGY OF TRANSITION AREAS

The model consists of two components. These are the spatial evolution of the transition pattern and the stage development of transition areas. Both components are concerned solely with the



land use and physical changes which restructure the morphology of residential areas. The spatial and temporal requirements of the model are outlined and then evaluated by describing major study findings in relation to particular measurement techniques. The model itself will then be described.

### Spatial Requirements, Measurement and Findings

The spatial requirements are that the directional bias and spatial movement through time of land use and physical change are explained by showing how the conversion and redevelopment processes shape the transition pattern. Direction and movement were measured by two methods. One involved mapping the distribution of conversion and redevelopment at ten-year intervals between 1921 and 1971. Although the areal extent of the transition pattern was clearly traced, this method told little about the dynamics of a process or about where change was concentrated in the city between time intervals. These deficiencies were overcome by calculating and mapping the percentage of dwellings which were actually converted or redeveloped during each ten-year period. Although this method required collecting and storing land use history data for over 90,000 residential properties, it is absolutely precise and therefore the most accurate way of measuring directional biases and spatial movements of land use and physical change. Use of census enumeration areas as



the units of observation for mapping procedures ensured the retention of pattern detail.

The calculation of simple correlation coefficients between measures of change and selected housing characteristics, as well as the analysis of changed and unchanged properties, revealed specific relationships between residential morphology and the spatial development of the transition pattern. These findings can be used to interpret essential features of the directional bias and spatial movement of land use and physical change.

Although discrepancies were observed, conversion was found to disperse concentrically and in a continuous outward progression from the major development nodes, especially from the central business district. The correlation analyses showed that conversion was strongly and positively associated with housing age. Thus, the zonal additions to the conversion pattern in each period are largely due to the aging of the housing stock. A wave of single-family development is followed by conversion activity. It was also observed that the highest density of subdivided houses was at all times concentrated within the innermost zones. This is because conversion has usually been directed toward the oldest available properties within an area. In addition, pattern formation was spatially differentiated by particular conversion forms. This differentiation





is directly attributable to the house types which are found in individual neighbourhoods. For example, two and three storey houses characterize those districts settled by 1920, in which upper-storey and multiple-family conversions predominate. Basement suites are more common in post-1940 areas of bungalow development.

During the 1950s, the focus of conversion activity was noted to shift outward from the central district to the post-war housing areas. However, since the supply of convertible properties had certainly not been exhausted in the central area, this change is not attributable to morphological factors. The beginning of apartment redevelopment provides the most plausible reason. The newly built apartments in the central area, by satisfying most of the increased demand for rental accommodation, made conversion in this area less necessary. During the 1960s, though, conversion ceased almost entirely. Again, this trend can be attributed to the marked increase of apartment construction. With the accompanying decrease in demand for converted accommodation, owners of some converted properties were forced to reconvert their houses to single-family use. This, too, restricted further expansion of the conversion pattern.

Changing land use and physical patterns which have resulted from redevelopment are also characterized by distinct





directional biases and spatial movements. Redevelopment, like conversion, has expanded from the central core, but its growth has been largely sectoral. The spread of high rise apartments into the high-rent district is directly associated with the positive environmental amenities of this sector. Here, as in the other major apartment districts, there is a concentration of older housing still in good condition, larger land parcels, and converted dwellings. Conversion indicates an established demand for rental accommodation. In contrast, developers have avoided areas of lower social prestige, such as the zone of discard with its adverse housing conditions, even though zoning permits redevelopment. The discontinuous distribution of redevelopment, however, is not related to morphological conditions. The clustering of apartments around major business and institutional centres and the radial development along major arterials is clearly related to accessibility advantages. In the selection of development sites within these areas, though, morphology plays a key role. For example, older properties are favoured over newer houses, while larger lots are preferred to smaller parcels.

### Temporal Requirements, Measurement and Findings

Guidelines for the stage development component of the model specify (1) that the relationship of each stage to its preceding or succeeding stage, through the identification of the formative



processes, is well defined; (2) that the characteristics of each stage are unique to that stage alone; and (3) that each stage should display empirically testable characteristics. These three requirements are closely interrelated and have been satisfied in this study by the use of several measurement techniques. Processes of land use and physical change were measured by comparing individual properties at specific time intervals through land use succession matrices. In this manner, the formative processes of transition areas were identified. Conversion was observed when a house had been altered to a higher-density use, whereas redevelopment was identified if a house had been removed or demolished and replaced by another residential building. From these matrices, it was also possible to produce a definitive account of the transition sequence which showed that there were indeed distinct stages of residential development. The requirement that each stage display empirically testable characteristics was met (1) by measuring the amount of land use and physical change, (2) by identifying the characteristics of converted and redeveloped properties, (3) by differentiating changed from unchanged properties, and (4) by specifying the order in which different types of properties succumb to change during the transition sequence.

Through satisfying the three requirements, and through showing how morphology influences conversion and redevelopment



processes, it is possible to describe basic features of the temporal dynamics of the transition sequence. It should be stressed, however, that the shift from one stage to another is not related to characteristics of the existing housing stock. Rather, processes exogenous to the residential area, which are related to the demand and preference for certain types of rental accommodation, are responsible for these shifts. However, the amount of change, types of change, and the sequence in which types of properties are converted or redeveloped in transition areas are clearly related to the morphology of a transition area.

The transition sequence was found to comprise successive stages of increasing housing density, including single-family development, conversion activity, and apartment redevelopment. Reconversion emerged as an important complement to redevelopment. Each stage has been characterized by an increased intensification of use and complexity of changes.

Conversion began slowly in single-family neighbourhoods during the 1920s, gained considerable momentum in the 1940s, and dominated the transition cycle well into the 1950s. Upper-storey and multiple-family suites, the earliest conversion forms, initially sought out larger two and three storey houses but later turned to smaller buildings. In fact, rather than house age, the size and type of houses found in an area largely determined the number of houses





yielding to conversion. For example, a neighbourhood containing many small cottages, even though developed at an early date, will show little evidence of a conversion stage. After 1950, basement suites emerged as the dominant type of conversion. Many of these were converted by owners who had only recently purchased their bungalow homes. In these cases, these houses had filtered-down to owner-occupiers who required additional sources of income.

In the 1960s, conversion was supplanted by apartment redevelopment. However, there was some overlap of the conversion and redevelopment stages, which is undoubtedly due to the size of the 1951 built-up study area. Because most of this area was unaffected by redevelopment, it is reasonable to expect that the demand for rental accommodation in some neighbourhoods would still be met through conversion. However, in areas of intensive redevelopment, conversion activity virtually ceased. In the major apartment districts, morphology has exerted a strong influence on the nature of the redevelopment process, specifically on the amount of redevelopment and on the sequence of replacement. Large land parcels and older houses, sometimes in poor condition, were quickly purchased by the developer before he turned to newer, better maintained and more expensive properties. Non-redeveloped properties are typically situated on small lots, owned by long-term owner-occupiers,



or recently constructed. Residential land use type has had little effect on the replacement process.

### The Model<sup>1</sup>,

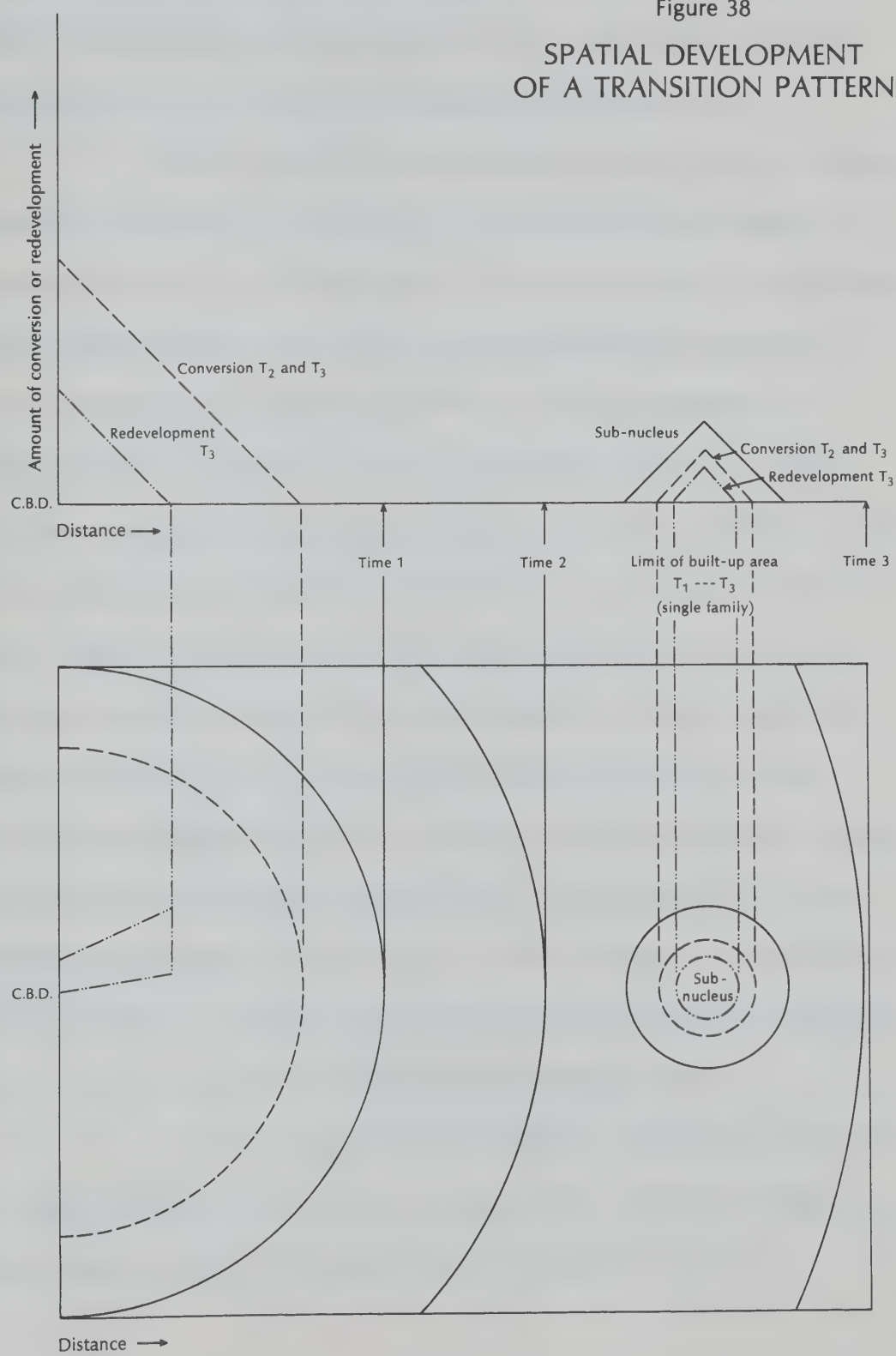
The spatial development of the transition pattern will be initiated by conversion activity which will first take place in aging neighbourhoods near the central business district and possibly near other nuclei (Figure 38). As time passes, conversion will diffuse concentrically, expanding the size of the transition area, as single-family houses are converted to higher-density use in a continuous outward progression. Depending on the morphology of the city, pattern development may be differentiated by various types of converted dwellings. At all times, however, the innermost zones will retain the highest density of converted dwellings, even though the focus of new conversion may in time shift away from the central area. Barriers may be encountered, but the growth of the conversion area will be generally characterized by zonal accretions. The width of a newly added zone will depend primarily on the demand for converted rental accommodation during a particular period. If this

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<sup>1</sup>"A model is thus a simplified structuring of reality which presents... significant features or relationships in a generalized form." P. Haggett and R. J. Chorley, "Models, Paradigms and the New Geography," in idem, eds., Models in Geography, London, Methuen, 1967, p. 22.



Figure 38  
SPATIAL DEVELOPMENT  
OF A TRANSITION PATTERN





demand is especially heavy, the areal extent of the converted area may be conterminous with the built-up city. Otherwise, a belt of single-family residences will surround the transition area.

When redevelopment becomes a major force of change, conversion activity will certainly lessen and the further expansion of conversion areas will probably halt. This is the result of redevelopment supplanting the conversion process as the major source of rental accommodation in the inner city. This interpretation is supported by the occurrence of the reconversion process, which coincides temporally with redevelopment and which contributes to the reduced intensity and possible contraction in size of the conversion area. Whereas reconversion will be most prevalent in newer housing areas, redevelopment will be concentrated in older residential areas near the central business district which were previously marked by dwelling conversion. A major apartment area will expand sectorally into a high-rent neighbourhood, while others will form radially along major access routes. Areas of lower social prestige will be shunned. Further, redevelopment will be spatially discontinuous, locating as well near outlying development nodes.

In their sequential development, transition areas will be distinguished by three stages, including (1) a period of single-family development, (2) a period characterized by dwelling





conversion, and (3) a period of apartment redevelopment. A generalized schema is presented in Figure 39, in which the types and amount of land use and physical change, as well as the order in which particular properties succumb to change, are summarized. The time scale, of course, applies to the Edmonton data only.

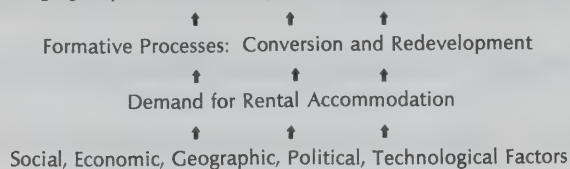
Initial residential development will consist almost entirely of single-family residences, although construction will likely be drawn out over a lengthy period. As a result, transition areas will be characterized by a variety of architectural styles. As an area begins to show the first signs of aging, a filtering-down process will take effect, and some of the new owners will find it necessary to convert their dwellings to more intensive use. The new owners of large two and three storey houses will probably subdivide their homes to multiple occupancy. Upper-storey conversion will be attracted to smaller buildings, including one-and-a-half storey and one-and-three-quarter storey dwellings. Construction quality and present condition will have little effect. These types of conversion will continue in older areas, but as housing styles change to the post-1940 era of bungalow development, basement conversion will emerge as the dominant conversion process. Some owners of converted properties may cease to rent out their accommodation, resulting in a land use shift to single-family status.



### Figure 39

## STAGE DEVELOPMENT OF RESIDENTIAL AREAS IN TRANSITION

#### Changing Physical Morphology of Residential Areas in Transition



#### STAGE 1 - SINGLE-FAMILY DEVELOPMENT

TIME	TYPES OF LAND USE AND PHYSICAL CHANGE	AMOUNT	HOUSING HOUSE	CHARACTERISTICS PARCEL	OCCUPANCY	LOCATION
ca. 1910	Vacant land developed by single-family houses	Moderate	One-and-three- quarter, two and three storey	Small and large	Owner and renter	Inner-city
1931		Minimal	Cottages			
1951		Heavy Minimal	Bungalows	Large	Owner	War-time housing areas

#### STAGE 2 - DWELLING CONVERSION

TIME	TYPES OF LAND USE AND PHYSICAL CHANGE	AMOUNT	CHARACTERISTICS HOUSE	OF CHANGED PARCEL	PROPERTIES OCCUPANCY	LOCATION
1921	Multiple-family and upper-storey conversion	Minimal	Larger Older	Large and small	Owner-renter(s)	Inner-city
1931		Moderate	Two and three storey		(Filtering)	
1941		Heavy	Bungalows Newer and smaller	Large		War-time housing areas and inner-city
1951	Basement conversion	Peak	Mixed types	Mixed types	Owner-renter(s)	
1961	All types of conversion	Minimal				
1971	Reconversion					

#### STAGE 3 - APARTMENT REDEVELOPMENT

TIME	TYPES OF LAND USE AND PHYSICAL CHANGE	AMOUNT	CHARACTERISTICS HOUSE	OF CHANGED PARCEL	PROPERTIES OCCUPANCY	LOCATION
1951	Low-density redevelopment	Minimal	Older Poorer quality	Large		
1961	Walk-up redevelopment	Moderate	Lower value		Owner and renter	Inner-city and near major development nodes
	High rise redevelopment		Older and newer	Large and small		
1971	All types of redevelopment	Heavy	Mixed quality			



As the demand for apartment accommodation increases, conversion will be supplanted by apartment redevelopment, even though the supply of potentially convertible houses will not have been exhausted. In the early phases of this stage, while land is still inexpensive, low density forms of redevelopment such as duplexes may sometimes precede apartments. Regardless of the form of redevelopment, older properties, dwellings in poorer condition, and large land parcels will be sought as the sites for development projects. Dwelling conversion may continue into the early phases of redevelopment, but once apartment construction becomes intensified, conversion activity will cease almost entirely. As the redevelopment process continues and only apartments are built, newer houses and homes in good condition will be replaced.

#### MODEL EVALUATION AND SUGGESTIONS FOR FURTHER RESEARCH

Because the model is based on detailed and comprehensive disaggregated data, it represents an accurate interpretation of the changing physical morphology of transition areas. Moreover, because processes of change have been identified and measured, and because the housing characteristics which influence conversion and redevelopment have been analyzed, a comprehensive description of transition area development has been presented. The model therefore





represents an important contribution toward the development of a theory of neighbourhood transition.

At the same time, though, the shortcomings of such a model must not be overlooked. By focussing solely on the relationship between housing characteristics and land use and physical change, a complete interpretation of transition area development was obviously not possible. Many questions remain unanswered. How do the socio-economic characteristics of different population groups influence conversion? What is the relationship between redevelopment and mortgage funding? What factors trigger the sudden shift from the conversion stage to the apartment stage? What conditions influence the demand for converted and apartment rental accommodation? All these questions are interrelated. Future studies are required to show how the economic, political and social conditions which underlie these questions interact with those housing variables analyzed in this study.

While techniques used to measure the sequential development of transition areas are reliable, it is conceivable that the choice of the study area may have concealed significant temporal variations among sub-areas. The question arises, do all areas experience conversion or redevelopment at the same stage in their life history? The derivation of a typology of transition areas, based



on time-series data, would therefore be a useful refinement to which the stage model outlined in this study could be compared.

The data for such a typology should comprise a complete survey of land use and physical change. This procedure is recommended because only the land use history and date of construction are necessary, and this material can be easily obtained and organized. Moreover, if a sample is required, complete data coverage of selected variables can be used to evaluate the accuracy of the sample. In an extensive survey of change, for example, when it is necessary to analyze the housing characteristics of properties experiencing land use change, a sample is appropriate because it is impossible to collect, in a reasonable length of time, comprehensive information for all the properties involved. This sampled housing data can then be compared to the complete, selected data. The procedure of the complete data coverage accompanied by random sampling was followed in this thesis. As a result, the sampling technique was found to be valid. Its accuracy can be checked by comparing the complete housing age data in Table 33 to the sampled housing age data in Table 37.

The explanation of the spatial development of the transition pattern relied on one date only (1961). On this basis, conclusions about the spatial evolution were derived. Collection of data for



individual properties and analysis of conversion and redevelopment through time suggested that conclusions derived from the one date analysis were reliable. However, it is probable that spatial relationships change through time and that spatial factors which might be important at one stage of the pattern's development may be irrelevant at a later date. For example, the relationship between large house size and conversion may be more relevant initially than in a subsequent period. Moreover, some of the housing variables probably work together rather than individually to influence change. Therefore, a multivariate statistical technique such as multiple correlation and regression analysis, applied at different time intervals, could be profitably utilized. However, as a first step in analyzing the effect of housing qualities on residential change, it was decided to analyze and evaluate each variable separately. In this study, these areal correlations could be confirmed by the data for individual properties.

In view of the fact that the model in this study and all of the substantive work of this thesis has related to a single city, obvious limits are imposed when any generalizations are made. No single city can be regarded as the perfect paradigm of the changing physical morphology of residential areas in transition. The study of cities of similar or contrasting size and age to Edmonton would undoubtedly provide illuminating insights into the model's predictive ability.



There is still a tremendous gap in knowledge of the dynamic aspects of the city. If further research on the city is to contribute to an understanding of growth and future patterns, it must focus on changes in time and on studies of processes of change. The contributions of this study to the analysis of urban change can be considerably extended in the future. "The spatial viewpoint of geography offers a fruitful methodology through which such clearer understanding may be achieved."<sup>2</sup>

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<sup>2</sup>B. T. Robson, Urban Analysis, Cambridge, Cambridge University Press, 1969, p. 250.





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## APPENDICES



## APPENDIX A

LIST OF VARIABLES COLLECTED FROM  
THE ASSESSOR'S DEPARTMENT

## LAND USE CHARACTERISTICS

(Coded at ten-year intervals 1921-1941;  
five-year intervals 1941-1971)

Single-family residences  
Du, tri, quad, or fiveples  
Rooming houses  
Row or terrace housing  
Walk-up apartments  
High rise apartments  
Residential-commercial  
Residential and other use

Two-family basement conversions  
Two-family upper-storey conversions  
Multiple-family conversions  
Duplex conversions  
Rooming house conversions  
Row and terrace housing conversions  
Walk-up apartment conversions  
High rise apartment conversions  
Residential-commercial conversions  
Residential and other use conversions

Commercial, office  
Commercial, general  
Industrial  
Institutional  
Parks and open space

Vacant land  
Vacant residential building  
Vacant non-residential building  
Undeveloped land joined to other use (by type)



## BUILDING CHARACTERISTICS

### House Types

- Shack
- Cottage
- Bungalow
- One-and-a-half storey
- One-and-three-quarter storey
- Two storey
- Three storey
- Duplex
- Rooming
- Row or terrace
- Walk-up apartment
- High rise apartment

### Architectural Style

- Modern
- Old

### Basement Type

- Full
- Part
- Surface foundation
- Wood sills

### Basement Height

- 7 1/2 feet and over (legal conversion height)
- 7-7 1/2 feet
- Less than 7 feet

### Construction Quality

- Excellent
- Good
- Fair
- Poor

### House Age

- Year built
- Age in years





## Period of Construction

Prior to 1920  
 1920 - 1929  
 1930 - 1939  
 1940 - 1949  
 After 1949

## House Life Expectancy

## House Size

Ground floor area (in square feet)  
 Number of rooms

## Building Maintenance

General repairs  
 Interior room addition  
 Exterior room addition

## Depreciation

Physical  
 Functional  
 Economic

## Assessment Value

## LAND CHARACTERISTICS

Area (in square feet)  
 Frontage width  
 Number of lots  
 Year built on  
 Land use (as above)  
 Assessment value

## OWNERSHIP CHARACTERISTICS

Occupancy type (1952, 1956, 1961, 1966 and 1971)  
 Owner(s) only  
 Renter(s) only  
 Owner(s) and renter(s)  
 Length of ownership  
 Number of ownership changes (1952-1971)  
 Change in ownership, by year, 1952-1971



ADDITIONAL INFORMATION COLLECTED FOR CONVERTED  
DWELLINGS

Year converted  
Ownership change associated with conversion  
Occupancy status when converted  
Dwelling age when converted  
Reconversion

ADDITIONAL INFORMATION COLLECTED FOR REDEVELOPED  
DWELLINGS

Year residence replaced  
Method of removing residence  
Age when replaced  
Occupancy status when replaced  
Land use when replaced  
Year bought by developer  
Length of ownership when replaced  
Price paid by developer



## APPENDIX B

TABLE 1

SITE SELECTION AND APARTMENT REDEVELOPMENT THROUGH TIME  
IN THE STRATHCONA REDEVELOPMENT DISTRICT<sup>1</sup>  
(BY PERCENTAGE OF HOUSES)

Housing Characteristics	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
Average parcel area	7,224	7,568	10,720	6,434	6,698	5,654	5,549	5,010	5,403	5,185	5,590	5,053	4,517
Average parcel width	60	61	83	50	50	45	42	38	42	40	42	40	31
Average age	50	44	45	48	49	47	46	45	45	39	39	41	41
Built prior to 1920	100.0	66.7	80.0	75.0	84.0	60.8	64.7	60.8	56.9	38.8	36.7	25.0	7.4
Built 1920 to 1939	-	33.3	-	12.5	8.0	31.4	23.5	17.4	20.7	21.2	16.3	25.0	77.7
Built after 1939	-	-	20.0	12.5	8.0	7.8	11.8	27.8	22.4	40.0	49.0	50.0	14.8
Single-family	100.0	100.0	100.0	25.0	72.0	88.2	76.5	87.0	65.5	77.6	57.1	75.0	88.9
Converted dwellings	-	-	-	75.0	28.0	11.8	23.5	13.0	32.8	21.2	35.8	18.8	7.4
Good construction	25.0	-	40.0	12.5	20.0	17.6	11.7	21.7	10.3	23.5	28.5	50.0	18.6
Fair construction	25.0	-	40.0	37.5	64.0	60.8	67.6	60.9	77.6	64.7	61.2	50.0	77.8
Poor construction	50.0	100.0	20.0	50.0	16.0	21.6	20.7	17.3	12.1	11.8	10.2	-	3.7
Demolished	75.0	100.0	100.0	87.5	72.0	72.5	82.4	65.2	60.3	51.8	48.0	37.5	100.0
Owner-occupied	25.0	-	-	25.0	40.0	47.1	50.0	69.5	37.9	54.1	31.6	43.8	55.6
Renter-occupied	75.0	66.7	100.0	37.5	48.0	49.0	38.2	21.7	53.4	35.3	49.0	56.2	40.7
Owner-renter	-	33.3	-	37.5	12.0	3.9	11.8	8.7	8.7	10.6	19.4	-	3.7
Average cost	5,250	13,567	23,625	10,950	19,677	19,561	16,738	14,769	14,549	18,874	25,684	25,100	27,011
Total properties	4	3	5	8	25	51	34	23	58	85	98	16	27

<sup>1</sup> Walk-up and high rise redevelopment has been grouped together.

Source: Complete housing survey, Assessor's Department, City of Edmonton, 1970-71.





## APPENDIX B

TABLE 2

SITE SELECTION AND APARTMENT REDEVELOPMENT THROUGH TIME  
IN THE PARLIAMENT HILL REDEVELOPMENT DISTRICT<sup>1</sup>  
(BY PERCENTAGE OF HOUSES)

Housing Characteristics	≤1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
Average parcel area	6,964	7,500	8,750	7,429	6,075	-	4,500	6,250	-	-	6,155	-	-
Average parcel width	46	50	58	50	41	-	30	50	-	-	41	-	-
Average age	43	52	49	44	42	-	41	54	-	-	52	-	-
Built prior to 1920	57.2	100.0	100.0	66.7	16.7	-	20.0	100.0	-	-	63.7	-	-
Built 1920 to 1939	28.6	-	-	28.5	83.3	-	60.0	-	-	-	36.3	-	-
Built after 1939	14.3	-	-	4.8	-	-	20.0	-	-	-	-	-	-
Single-family	71.4	100.0	33.3	42.9	50.0	-	80.0	33.3	-	-	54.5	-	-
Converted dwellings	28.6	-	66.7	57.1	33.3	-	20.0	66.7	-	-	36.4	-	-
Good construction	-	-	33.3	9.6	33.3	-	20.0	-	-	-	27.3	-	-
Fair construction	57.1	-	66.7	76.2	33.4	-	80.0	66.7	-	-	45.4	-	-
Poor construction	42.9	100.0	-	15.2	33.3	-	-	33.3	-	-	27.3	-	-
Demolished	85.7	100.0	100.0	90.5	100.0	-	100.0	100.0	-	-	100.0	-	-
Owner-occupied	42.9	100.0	-	23.8	16.7	-	-	16.7	-	-	9.1	-	-
Renter-occupied	42.9	-	33.3	61.9	66.6	-	100.0	83.3	-	-	81.8	-	-
Owner-renter	14.3	-	66.7	14.3	16.7	-	-	-	-	-	9.1	-	-
Average cost	13,743	18,000	34,000	22,326	31,800	-	20,000	23,883	-	-	24,611	-	-
Total properties	7	1	3	21	6	-	5	6	-	-	11	-	-

<sup>1</sup> Walk-up and high rise redevelopment has been grouped together.

Source: Complete housing survey, Assessor's Department, City of Edmonton, 1970-71.



## APPENDIX B

TABLE 3

SITE SELECTION AND APARTMENT REDEVELOPMENT THROUGH TIME  
IN THE OLIVER REDEVELOPMENT DISTRICT<sup>1</sup>  
(BY PERCENTAGE OF HOUSES)

Housing Characteristics	≤1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
Average parcel area	7,580	8,756	7,500	8,183	7,500	6,287	6,589	4,841	5,906	5,757	5,751	5,442	5,213
Average parcel width	51	57	50	60	50	42	45	36	40	39	40	41	35
Average age	46	47	51	42	41	46	42	46	49	49	47	50	46
Built prior to 1920	80.0	91.7	75.0	61.5	58.3	60.0	44.4	52.8	64.0	62.3	46.4	57.1	13.4
Built 1920 to 1939	20.0	8.3	25.0	38.5	25.0	40.0	37.0	36.1	28.0	28.3	43.2	28.6	73.3
Built after 1939	-	-	-	-	16.7	-	18.6	11.1	8.0	9.4	10.4	14.3	13.4
Single-family	80.0	66.7	75.0	61.5	50.0	66.7	74.1	77.8	56.0	39.6	65.3	57.1	73.3
Converted dwellings	17.2	33.3	25.0	38.5	50.0	33.3	25.9	16.7	40.0	52.9	29.5	35.7	13.4
Good construction	20.0	25.0	-	53.8	33.3	20.0	18.5	22.2	17.7	30.2	28.6	50.0	26.7
Fair construction	45.7	66.7	100.0	30.8	58.3	53.3	77.8	63.9	73.3	64.2	60.0	50.0	60.0
Poor construction	34.3	8.3	-	15.4	8.3	26.7	3.7	13.9	9.3	5.6	11.6	0	13.3
Demolished	91.4	100.0	100.0	76.9	58.3	33.3	48.1	63.9	90.7	88.7	78.9	85.7	93.3
Owner-occupied	31.4	33.3	-	-	33.3	46.7	40.7	36.1	22.7	18.9	34.7	14.3	26.7
Renter-occupied	60.0	66.7	100.0	84.6	50.0	33.3	44.4	52.8	64.0	64.2	52.6	64.3	60.0
Owner-renter	8.6	-	-	15.4	16.7	20.0	14.8	11.1	13.3	17.0	12.6	21.4	13.3
Average cost	14,721	25,444	7,500	31,407	16,425	19,253	20,044	15,667	22,454	23,849	29,912	28,678	23,104
Total properties	35	12	4	13	12	15	27	36	75	53	95	14	15

<sup>1</sup> Walk-up and high rise redevelopment has been grouped together.

Source: Complete housing survey, Assessor's Department, City of Edmonton, 1970-71.



## APPENDIX B

TABLE 4

SITE SELECTION AND APARTMENT REDEVELOPMENT THROUGH TIME  
IN THE QUEENS AVENUE REDEVELOPMENT DISTRICT  
(BY PERCENTAGE OF HOUSES)

Housing Characteristics	≤1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
Average parcel area	7,500	7,500	7,500	7,500	6,357	5,893	7,111	6,900	7,192	6,473	6,718	6,818	5,588
Average parcel width	50	50	50	50	43	39	42	46	48	43	46	46	39
Average age	42	50	43	36	40	40	31	34	29	34	34	37	45
Built prior to 1920	70.8	100.0	66.7	33.3	42.9	35.7	33.3	20.0	10.9	22.4	23.6	45.5	28.6
Built 1920 to 1939	20.8	-	33.3	44.4	39.3	50.0	17.8	44.0	24.6	27.6	17.7	-	47.6
Built after 1939	8.3	-	-	22.2	17.8	14.3	48.9	36.0	64.4	50.0	58.7	54.5	23.8
Single-family	100.0	66.7	33.3	77.8	92.9	78.6	77.8	60.0	68.5	72.4	68.6	81.8	71.4
Converted dwellings	-	33.3	66.7	11.1	3.6	21.4	17.7	40.0	27.4	18.9	23.5	18.2	23.8
Good construction	-	33.3	-	-	3.6	7.1	8.8	4.0	20.5	10.3	19.7	18.2	4.8
Fair construction	58.3	66.7	100.0	88.9	71.4	57.1	84.4	92.0	61.6	86.2	72.5	81.8	85.7
Poor construction	41.7	-	-	11.1	25.0	35.8	6.8	4.0	17.8	3.4	7.8	-	9.5
Demolished	70.8	66.7	100.0	22.2	46.4	50.0	35.6	52.0	34.2	29.3	39.2	54.5	81.0
Owner-occupied	41.7	33.3	-	22.2	32.2	42.9	33.3	28.0	46.6	39.7	41.2	27.3	28.6
Renter-occupied	58.3	66.7	100.0	55.6	64.3	57.1	55.6	48.0	35.6	41.4	39.2	45.5	66.7
Owner-renter	-	-	-	22.2	3.6	-	11.1	24.0	17.8	19.0	19.6	27.3	4.7
Average cost	8,412	8,100	11,833	14,500	13,471	11,536	14,251	14,617	16,134	17,639	25,700	22,318	20,488
Total properties	24	3	3	9	28	14	45	25	73	58	51	11	21

Source: Complete housing survey, Assessor's Department, City of Edmonton, 1970-71.



## APPENDIX B

TABLE 5

SITE SELECTION AND APARTMENT REDEVELOPMENT THROUGH TIME  
IN THE NORTHERN ALBERTA INSTITUTE OF TECHNOLOGY REDEVELOPMENT DISTRICT  
(BY PERCENTAGE OF HOUSES)

Housing Characteristics	≤1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
Average parcel area	-	-	-	-	7,500	-	6,930	7,500	7,687	7,137	7,190	6,420	-
Average parcel width	-	-	-	-	50	-	50	50	51	48	48	44	-
Average age	-	-	-	-	31	-	32	56	36	33	27	36	-
Built prior to 1920	-	-	-	-	38.9	-	-	100.0	30.8	25.0	6.7	25.0	-
Built 1920 to 1939	-	-	-	-	5.6	-	50.0	-	23.1	6.8	6.6	12.5	-
Built after 1939	-	-	-	-	55.5	-	50.0	-	46.1	65.9	86.7	62.5	-
Single-family	-	-	-	-	100.0	-	100.0	100.0	100.0	95.5	100.0	75.0	-
Converted dwellings	-	-	-	-	-	-	-	-	-	4.5	-	25.0	-
Good construction	-	-	-	-	-	-	-	-	7.7	2.3	-	18.2	-
Poor construction	-	-	-	-	61.1	-	-	-	53.8	84.1	93.3	81.8	-
Fair construction	-	-	-	-	38.9	-	100.0	100.0	38.5	13.6	6.7	-	-
Demolished	-	-	-	-	33.3	-	-	100.0	92.3	40.9	40.0	37.5	-
Owner-occupied	-	-	-	-	61.1	-	50.0	-	46.2	56.8	60.0	25.0	-
Renter-occupied	-	-	-	-	38.9	-	50.0	100.0	53.8	40.9	40.0	75.0	-
Owner-renter	-	-	-	-	-	-	-	-	-	2.3	-	-	-
Average cost	-	-	-	-	12,847	-	12,000	7,200	12,433	15,119	19,348	18,500	-
Total properties	-	-	-	-	18	-	2	1	13	44	45	8	-

Source: Complete housing survey, Assessor's Department, City of Edmonton, 1970-71.







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